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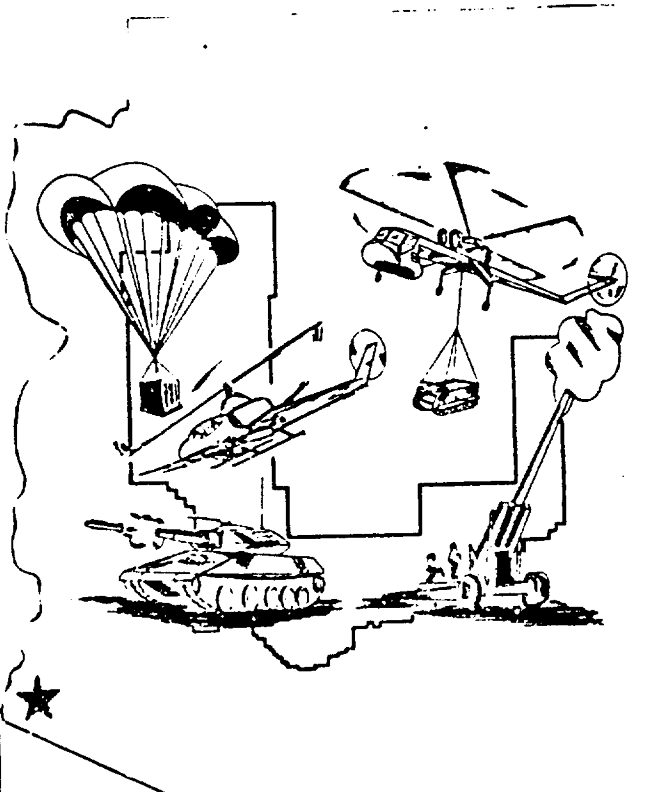

(10) Harry A. / Greveris

UNITED STATES ARMY

YUMA PROVING GROUND

YUMA, ARIZONA

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This handbook is a compendium of the US Army's experience in testing equipment in a desert environment. Topics covered include world areas analogous to Yuma Proving Ground, Yuma Proving Ground environment, environmental effects, materiel degradation, human factors engineering, and desert maintenance.

This document should provide valuable information for those who design, use, or test equipment for eventual deployment in hot-dry areas of the world.

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FOREWORD

This document was prepared at the request of the US Army Test and Evaluation Command (TECOM) to provide industry information on the adverse effects a desert environment can have on materiel and on the similarities between the environment of Yuma Proving Ground (YPG) and the major desert areas of the world.

Although testing has been conducted at the proving ground since World War II, there is a paucity of specific published information on desert testing and effects. Much valuable information has been lost. This Installation is continuously updating and refining information on desert effects to broaden the data base. Recipients of this report who have knowledge of any relevant reports or specific data not covered in this document should send such information to Yuma Proving Ground.

It is hoped that this document will promote a better understanding by materiel developers of the physical and mechanical stresses that a desert environment may impose on man and materiel and provide information on the probability that materiel tested in the environment at YPG will successfully operate in other desert areas of the world.

Ernest E. Beach

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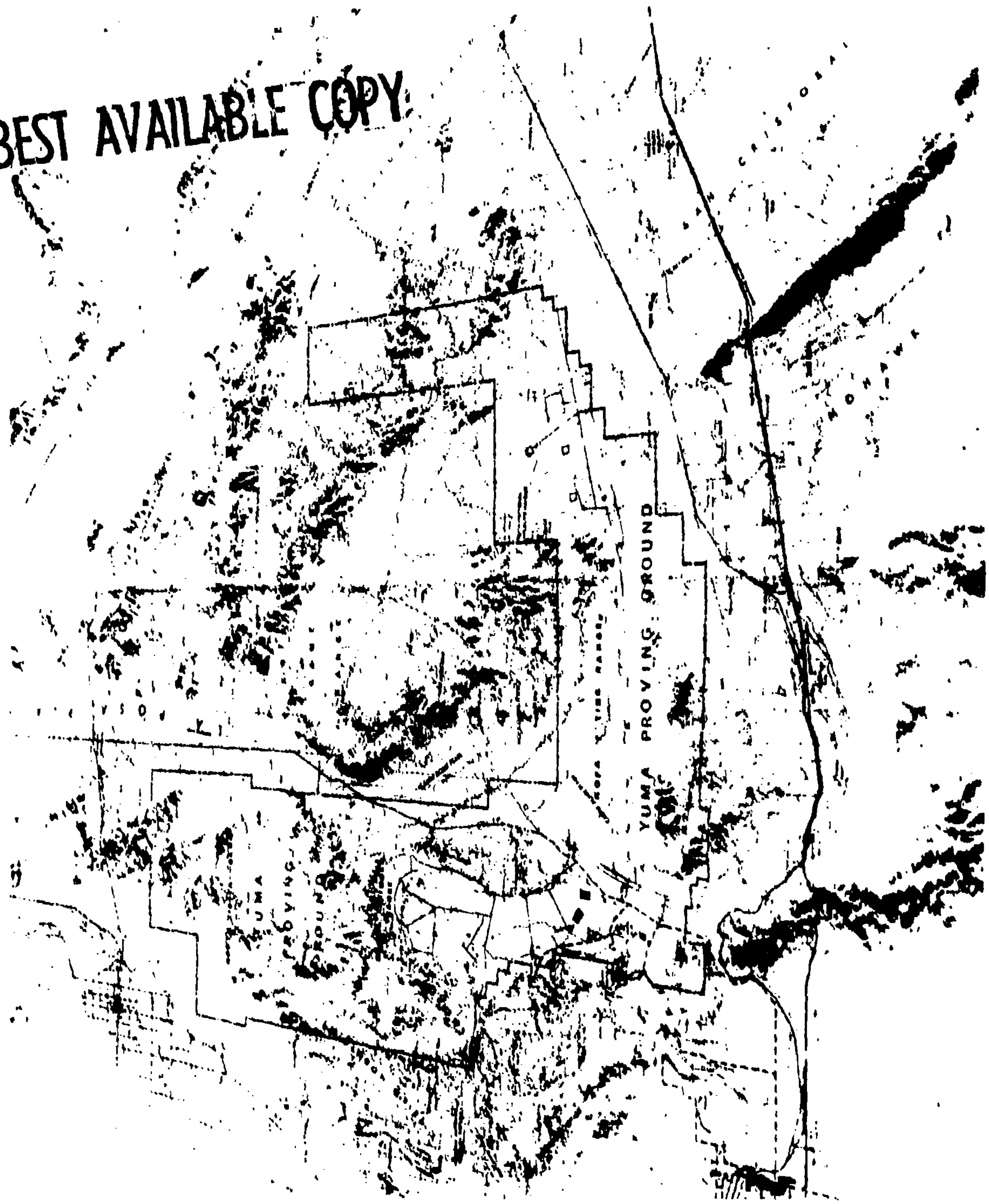
Colonel, QMC
Commander

YPG - THE PROVING GROUND OF THE FUTURE


YUMA PROVING GROUND
YUMA PROVING GROUND

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1.1 Desert Definition and Classification. The sole common characteristic of all deserts is their aridity. It is this lack of moisture that lies at the heart of desert problems, from the adaptation of plants and animals for existence under desert conditions to the utilization of desert areas by man. "True" deserts result from a deficiency in the amount of precipitation received relative to water loss by evaporation. Deserts, then, as the term is generally used, are basically a climatic phenomena.

The world's deserts can be classified in many different ways. As a result, precise delimitation of desert areas is difficult. While all authorities generally agree upon the "core" areas or the desert outer limits. Variation is based upon the severity of the aridity and consequent effects on vegetation and soil. By the most widely accepted classification system set by Koeppen, the boundary between humid and semiarid is drawn where the evaporation rate equals the precipitation rate; and similarly the boundary between semiarid and arid is set at the point where the evaporation rate is twice as great as the precipitation rate.

Excluding cold arid regions, such as Antarctica, deserts generally lie along the Tropic of Cancer and the Tropic of Capricorn extending from about 15° to 40° north and south latitude (Figure 1). This large expanse of desert area comprises about 19 percent of the earth's total land mass. There are twelve regions named as major deserts of the world[1]. These are:

DESERT NAME	LOCATION	APPROXIMATE AREA (THOUSANDS OF SQ MILES)
Sahara	North Africa	3500
Australian	Australia	1300
Arabian	Arabia	1000
Turkestan	South Russia	750
North American	US and Mexico	500
Gobi	Mongolia	400
Patagonia	Argentina	260
Thar	India	230
Kalahari	South Africa	230
Takla Makan	West China	200
Iranian	Iran	150
Atacama-Peruvian	Peru-Chile	140

Politically and militarily, the most important deserts are found in the Middle East (the Arabian and the Sinai), North Africa (the Libyan and the Sahara), and Mongolia (the Gobi). These deserts are of importance because: (1) they separate two or more spheres of political and religious influence, (2) they contain valuable mineral deposits,

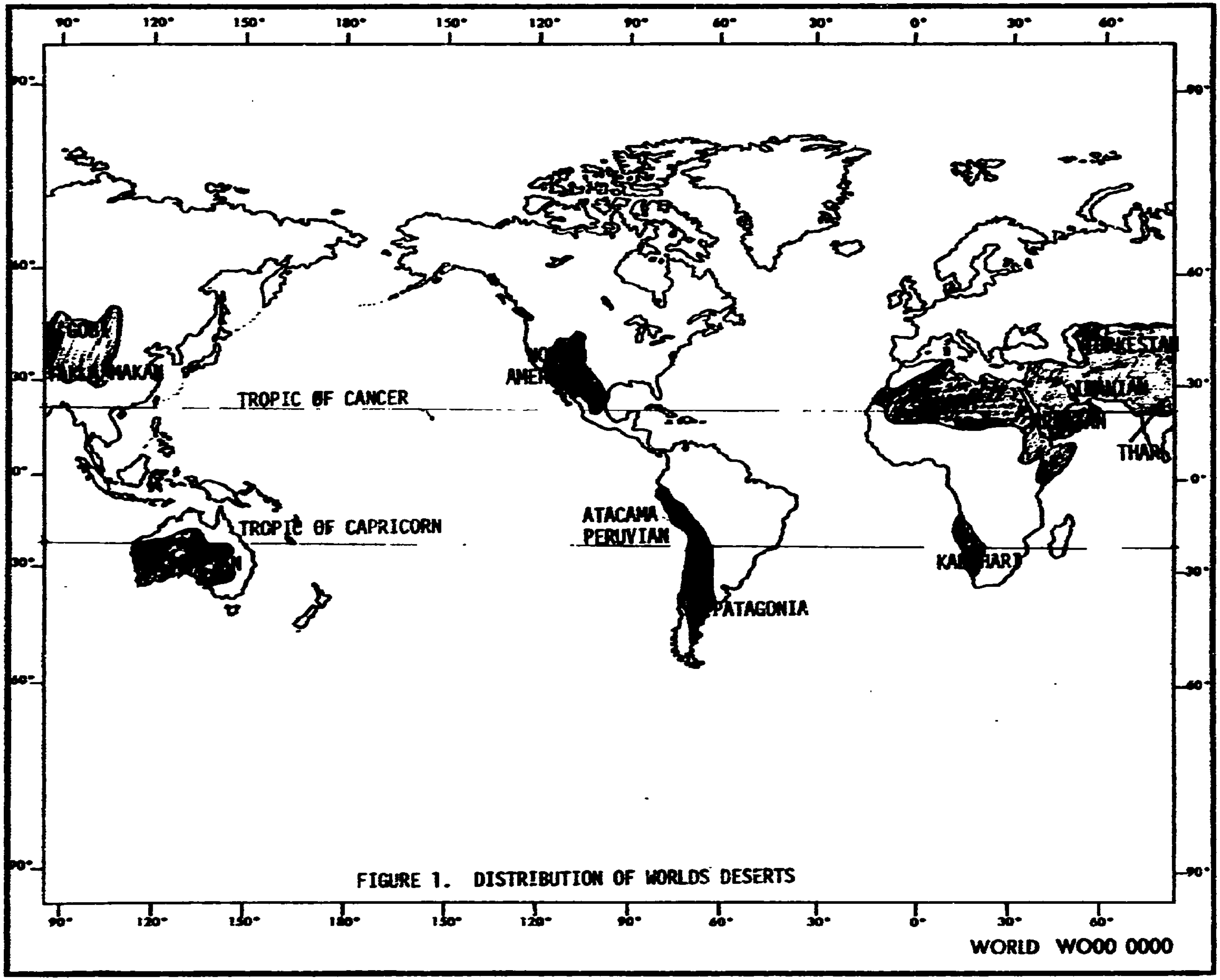


FIGURE 1. DISTRIBUTION OF WORLDS DESERTS

3-72 PRINTED BY U. S. ARMY TOPOGRAPHIC COMMAND

(3) they have strategic implications because of their locations, and (4) the Middle East deserts are the site of major petroleum producing activities.

1.2 World Climate Areas Analogous to Yuma Proving Ground. The desert of the Yuma, Arizona, area is of particular interest to the Army because this is the desert locale in which the majority of Army materiel is field tested and evaluated. It is, therefore, important that the environment at Yuma be comparable to that of the world deserts in which the US Army equipment will be deployed. Numerous analog studies have been conducted by the US Army Natick Development Center[2], and the US Army Waterways Experiment Station[3] comparing the Yuma climate and terrain with other desert areas of the world. These studies indicate extensive analogy between environmental factors at Yuma Proving Ground and the major desert areas of the world. Annex A contains the climatic elements of each of the world desert areas used in the analog studies.

1.2.1 Middle East (Arabian and Syrian) Desert. Of all the major deserts of the world, the Middle East environment most closely corresponds to that of Yuma Proving Ground. The similarity is particularly close in all important respects, both winter and summer, in the valley of the Jordan River in Israel and Jordan, and in the southern part of the Mesopotamian lowland between Baghdad and Basra. Although these areas of close analogy are of small extent, areas in which single elements of the climate, such as winter temperatures, summer temperatures, and annual precipitation are analogous include very considerable parts of the Middle East. The yearly distribution of precipitation is roughly comparable to that of Yuma only on the south coast of Arabia where rain is received in both summer and winter, while the mean annual precipitation of the Mediterranean coast and the highlands is in excess of that at Yuma. Average and extreme values of temperature are closely analogous to those at Yuma over considerable areas. Wind speeds in general are much higher than in Yuma expecially during daytime accompanied by clouds of dust from the dry, dusty plains to heights above 5000 feet. Reduction in visibility due to dust storms is more frequent in eastern and southern Iraq than in Syria, and Jordan. Radiation load, in terms of both daily total and peak intensity, is similar to that measured at Yuma Proving Ground.

1.2.2 North Africa (Sahara, Libya and Nubian). This vast area consists of the Saharan and Libyan deserts which form a continuous arid region from the Atlantic Ocean to the Red Sea. This region is drier than Yuma everywhere except in a few elevated places. Rainfall is quite different from Yuma with respect to seasonality in that this region has a pronounced winter maximum in the north and summer maximum in the south in contrast to the occurrence of both summer and winter maxima at Yuma. The interior of the Sahara and Libyan deserts are less humid and even more sunny than Yuma. Winds in the interior desert, although predominantly lighter than Yuma are more persistent and often blow steadily in one direction for weeks or even months resulting in frequent sandstorms and reduced visibility.

1.2.3 Australian. The climate in much of Australia is analogous to that at Yuma in one or more elements, especially mean monthly temperature. The continent is much more comparable to Yuma in winter than in summer. Most of the continent receives too much precipitation for close analogy of more than two elements, except in the Lake Eyre basin. Even the driest station in Australia receives more rain than Yuma. Mean relative humidities, however, are analogous to those at Yuma.

1.2.4 Turkestan. The climate of this region is governed by two climatic controls. First, the region is completely open toward the north, but separated by high mountain ranges from the south and west; and second, the latitude of the region extending from 36° to 54°N is higher than that of most regions considered "hot" deserts. Winter is extremely cold in the north and moderately cold in the south, and is not comparable to the mild winter at Yuma. In summer, however, the continentality of the region is reflected in clear skies, strong insolation, resultant high temperatures, and moderately large daily range of temperature. Precipitation in the lowlands of the region is meager, varying from 4 to 10 inches a year. Dust storms are frequent in the area especially during the summer dry months.

1.2.5 Chinese Inner Asia (Takla Makan and Gobi). The harsh dry climate of this area is a result largely of its relatively high latitude, its elevation, its location within the interior of the world's largest continent, and its mountain borders. Because of these factors, winters are extremely cold with mean temperatures below freezing throughout the region and below zero in the north. The world's highest atmospheric pressue (reduced to sea level) is centered over Mongolia in winter. In summer, however, the continentality of the region is reflected in clear skies, strong insolation, resultant high temperatures, and moderately large daily range of temperature. Temperatures above 100°F can be expected in most days in July. A considerable portion of this area has mean annual precipitation of less than two inches.

1.2.6 North American (Sonoran, Mohave, Great Basin). A core area of close analogy to the Yuma climate exists in southeastern California, and in adjoining parts of Mexico. The Sonoran desert is generally considered the hottest and driest in North American other than that of Deatn Valley. The Mojave Desert is warm in summer with mean temperatures in the upper eighties; mean winter temperatures are in the forties. The higher elevation and slightly greater precipitation of this desert tend to make vegetation more pronounced than in the hotter deserts. The Great Basin deserts are cool in comparison with those farther south; their summer mean temperatures are in the seventies, and winter mean temperatures are below freezing in many places.

1.2.7 Kalahari. The climate of the Kalahari might be described as a high altitude variant of the Yuma climate. In terms of temperature range, both diurnal and seasonal, the Kalahari and Yuma are similar. Differences in temperature reflects the depressing effects of higher elevation, Kalahari temperatures being much lower than those of Yuma. The Kalahari is wetter than Yuma (15 to 20) inches; however, seasonal pattern is similar. The mean temperature for the coldest month is analogous to Yuma.

1.2.8 South American (Atacama-Peruvian, Patagonian). The climate of the Atacama and the Patagonian Deserts, and the dry coastal areas of Peru differs greatly from that of Yuma. Mean summer temperatures are in the seventies in comparison to the nineties of Yuma. Mean winter temperatures are in the sixties, closely analogous to those at Yuma. Precipitation is generally less than one inch annually thoughout the region. In Patagonia the rainfall is comparable to Yuma, but summer temperatures are even lower than those in the Atacama Desert. Winter temperatures are much colder than those at Yuma, averaging in the thirties.

1.2.9 South Central Asia (Iranian, Thar). Extensive areas of South Central Asia have summer temperatures analogous to those at Yuma. Only in the extremely hot Indus Valley of Pakistan and the interior basins of Iran, and in the perennially cool mountains of Kashmir, Afghanistan, and northern Iran are summer temperature regimes appreciably different from those at Yuma. Mean annual precipitation (less than 9 inches) falls within some degree of analogy over most of the area. The only areas with higher rainfall are the lowlands of India subject to monsoon rains, the northwestern part of Iran bordering Caspian Sea, and some of the higher mountains.

1.3 Desert Environmental Aspects. Most materiel developed for the Army must operate effectively anywhere in the world. However, when placed in extreme environments, many items perform below the standards expected or fail entirely. A large number of these malfunctions can be traced directly to environmental factors that had not been considered when the equipment was developed or had been waived as unimportant by individuals who were unaware of the severity of the stresses that can be imposed on materiel, and personnel, by environmental conditions.

1.3.1 Climate.[4] Heat causes crazing and cracking of rubber, plastics and other materials. It causes gasoline and other fuels to deteriorate rapidly due to build up of resins, gums, etc., which in turn may cause engine malfunction. Heat produces an expansion of metals, and where bimetallic compounds are utilized, it may result in unequal expansion rates with consequent malfunction. Propellants break up resulting in higher pressures and possibilities for explosion. Low humidity coupled with actinic radiation dries out nylon fibers of parachutes and ropes, increasing the likelihood of malfunction, failure and disaster.

Owing to excessive expansion of liquids and excessive evaporation, coolant levels in vehicles, oils in crankcases, transmission fluid

levels, etc., must have preventative maintenace by frequent checks of their levels. These vital liquids are also frequently contaminated with sand particles and dust, which rapidly multiply failure rates of engines an [illegible]bricated components. Heat dries out greases in the moving parts of vehicles, producing "hot boxes" and breakdowns. Surfaces of materiel (rifle barrels, tank surfaces, etc.) may reach temperatures of 62.8-79.4°C (145-175°F) causing unprotected skin of personnel to blister. Heat injuries are common when working personnel are exposed to high ambient temperatures, especially in direct sunlight.

1.3.2 Terrain.[5] Slopes composed of loose materials such as bouldery gravels on alluvial fans and fine sands in dune areas provide poor traction for vehicles. Stream beds, canyons, etc. provide gravel and road bases and may give good concealment in places for movement of forces. However, sudden thunderstorms may result in extremely high runoff resulting in danger to personnel and equipment in wash areas. Dust particles in desert areas are frequently associated with chlorides, carbornates and sulfides which in their impure state are hygroscopic and thus cause corrosion of moving parts of equipment. Silica particles of sand result in erosion of metals, erosion of moving parts and pitting of glass in high winds. Exposed rocks shorten life of vehicle tires. Desert vegetation is normally sparse, providing little concealment for troops or equipment and therefore concealment requires use of dispersal of equipmont and camouflage materials. Downwash from the helicopter rotor raises sufficient dust and sand from the disturbed desert floor to envelop the aircraft during take-off, hovering or landing. The amount of raised dust and sand may be sufficient to clog air filtering equipment and to obliterate any visual reference with the ground. During afternoon hours, the high ambient temperatures reduce lift capacity, while wind and air turbulence near the ground impair the craft's use as a gun platform and also interfere with accuracy of fire. The marked air density gradient or air turbulence in the lower few hundred feet may limit the effective length of line-of-sight for target acquisition.

Section 2 - Yuma Environment[6, 7]

2.1 Climate. Yuma Proving Ground (1400 sq. miles) is situated in one of the hottest and driest parts of the United States. It is located adjacent to the Colorado River in the extreme southwest corner of the state of Arizona and forms a part of the physiographic region known as the Sonoran Desert. The Installation is centered at 32°53' north latitude and 114°27' west longitude. The climate variations result more from a lack of latitudinally-related lifting of wet air masses (from the Eastern Pacific high off the west coast during the winter, and the Bermuda high off the east coast and the Gulf of California circulation during the summer) than from rain shadow effects of mountain highlands. Atmospheric moisture is available, occasionally abundant, but reaches the ground as rain predominantly in the mountains where condensation by localized lifting of air masses compensates partially for the lack of regional lifting. In the Castle Dome Mountains, 37 km (23 miles) northeast of the Proving Ground meteorological station, for example, yearly rainfall is as much as 25.4 cm (ten inches), but at the station it averages 8.5 cm (3.4 inches). (1952-1976)

The year round climate of Yuma Proving Ground is characterized by high solar radiation, high summer and moderate winter temperatures, low precipitation and relative humidity, clear skies and unlimited visibility, and light surface winds. Within this generalized characterization, however, there are rather wide yearly, seasonal, and even diurnal variations in many of the climate elements.

2.1.1 Temperature. Yuma presents a fairly representative sample of subtropical desert conditions. Its summers are hot and long, with temperatures 37.8°C (100°F) or above being recorded on one third of the days in the year and also on everyday from June to early September. Temperatures of 46.1°C (106°F), are not uncommon and the absolute maximum to date is 47.8°C (118°F) based on records from 1952. In July, the hottest month, the mean maximum is 41.1°C (106°F), and the mean minimum is 27.2°C (81°F) The high ambient air temperatures at YPG, particularly in the summer, result from the cummulative effects of several environmental conditions; high ground-surface temperatures induced by intense solar radiation little inhibited by cloudiness, long passage of air over the heated surface, horizontal movement of previously heated air into the area, downward movement of air masses with resultant heating and evaporation of any moisture droplets, and minor movement of hot dry air from the low sides of mountains. Appendix B contains the YPG climatological calendar by month for the period 1954-1973.

2.1.2 Precipitation. Yuma has an annual average rainfall of only 8.5 cm (3.4 inches), as measured at the meteorological station in the Mobility Complex. Amounts of rainfall in individual years, however, have varied from .53 cm (0.21 inches)(1956) to 16.26 cm (6.40 inches)(1965). Precipitation occurs in two well defined seasons, winter and summer, with distinctly drier springs and autumns. The winter precipitation is

characterized by long-lasting, soaking drizzles and light rains while summer rains are associated with thunderstorms, short-lived, local, yet productive of large amounts of water, much of which runs off over the ground surface. August, the rainiest month, has an average monthly precipitation of .24 cm (0.49 inches), with a recorded maximum of 7.62 cm (3 inches) (1972) in a 24 hour period.

2.1.3 Humidity. The mean relative humidity is lowest during the period April thru June (less than 30 percent). During the remainder of the year, the average daily humidity ranges from 34 percent to 42 percent in December. The humidity seems excessive to people only in July, August, and September, when temperatures are high and moist tropical air moves into the area from the Gulf of California (the so called Arizona summer monsoon).

Dew point varies widely during the summer. In May and June, approximately 80 percent of all hourly values are between -1.1°C (30°F) and 10°C (50°F), but in July and August 80 percent lie between 10°C (50°F) and 23.9°C (75°F), revealing the predominance of more humid air during the latter period. During both the dry and humid period there is a diurnal variation of 5 to 10 degrees with the maximum occurring around 0800 and the minimum from 1500 to 1700. The dry and humid periods are each marked by intervals of a few days during which dewpoint departs markedly from the general values. In July and August, for example, nighttime dew points usually average between 60° and 75°F but occasionally drop for a few nights to the 30's and 40's or even lower.

2.1.4 Cloudiness. Most of the clouds over YPG are of the cirrus genera type, formed largely of ice crystals and with bases at an average altitude of about 25,000 feet. The cumulus cloud types are common over the mountains from July to October and are formed by condensation of locally rising moist air; they also occur over broad areas of low relief as a result of convection currents.

Cloudiness at YPG is low throughout the year. On a yearly average, the skies are clear, (0-0.3 total sky cover), 67 percent of the time, partly cloudy (0.3-0.7 cover) 24 percent of the time, and cloudy (0.8-1.0 cover) 9 percent of the time. In winter, the cloudiest season, the averages are: clear 54 percent, partly cloudy 29 percent, and cloudy 17 percent. In the transitional period, just before and after summer, the least cloudy season averages are approximately: clear 74 percent, partly cloudy 20 percent, and cloudy 6 percent.

2.1.5 Barometric Pressure. The barometric pressure in the Yuma area is generally high throughout the year as shown in Annex B.

2.1.6 Surface Inversion. Air temperature normally decreases with rising elevation. However, when it increases to some altitude above the surface, an inversion is formed. The boundary between the surface layer and overlying

layers of air may inhibit the escape of particulate matter, such as smoke, and also acts as a reflective and/or refractive surface important in considerations of noise propagation. Inversions occur almost daily but dissipate by noon.

2.1.7 Density Altitude. A critical factor in aircraft flight operation is density altitude which affects lift and hover capability at maximum weight. The density altitude is temperature sensitive, i.e., high temperatures result in high density altitudes. This factor is very important in desert areas where summer temperatures are in excess of 37.8°C (100°F) and consequently aircraft may be limited to reduced load operations. Yuma's density altitude distribution is representative of most desert areas of the world. Table 1 is the average hourly density altitude during regular operating hours based on average temperature, pressure, and relative humidity.

2.1.8 Winds. Winds above approximately 20,000 feet altitude in the Yuma area are predominantly from the western quadrant. Below that height, the direction varies, often from the southerly quadrant in the summer, in layers controlled by the influences of other, often moist, incoming air-masses, and from the northerly quadrant in the winter.

Surface wind directions at YPG are modified by the local topography. On a typical summer afternoon the surface air is essentially from the Gran Desierto of Northern Mexico, over the Colorado River lowlands, and through the river gap in the eastern rim of the Yuma Valley. Although comparatively shallow (150 to 200 feet), the river gap often influences the wind direction at the Proving Ground.

Surface wind speeds at the meteorological station in the Mobility Complex are generally light throughout the year, averaging 4-6 miles per hour. If there is a "windy" season at YPG, it is during the period April-August, but it is poorly defined and winds are always unpredictable, even capricious. Peak windspeeds (gusts) average 16 mph during December-February, 21 mph in March-May, and 22 mph in June-August and 17 mph in September-November. The strongest gust recorded at the Proving Ground was 71 mph in 1970.

Winds at all low-lying areas of the Proving Ground are strikingly similar at all hours, showing strength throughout the day and weakness and variability of direction at night. From about 1800 hours in the evening to 0700 in the morning, the air has little or no motion, with winds averaging a scant one to two mph during the period of nighttime inversion. After sunrise, the winds pick up rapidly with the average climbing to 5 to 7 mph by 1000 hours, a level maintained thoughout the remainder of the day. Winds at higher, mountainous areas are more consistent in direction than at lower lying areas and have greater velocities, even at night.

TABLE 1

ASL YUMA MET TEAM
U.S.A.Y.P.G., YUMA, ARIZONA
AVERAGE HOURLY DENSITY ALTITUDE
BASED ON HOURLY AVERAGE TEMPERATURE, PRESSURE, RELATIVE HUMIDITY, & DEW POINT

JANUARY

HR	TEMP	PRESS	RH	DP	DA
07	43	1006.4	57	29	-750
08	43	1006.9	57	29	-780
09	47	1007.5	53	27	-490
10	52	1008.0	46	32	-130
11	56	1008.1	40	32	+130
12	60	1007.5	35	32	+430
13	62	1006.3	32	32	+620
14	65	1005.4	30	33	+840
15	66	1005.0	28	32	+920
16	67	1004.8	30	35	+990

FEBRUARY

HR	TEMP	PRESS	RH	DP	DA
07	47	1005.1	52	30	-480
08	48	1005.7	51	31	-420
09	53	1006.2	44	32	-030
10	57	1006.6	38	32	+260
11	62	1006.6	33	33	+590
12	66	1006.2	29	33	+870
13	69	1005.3	26	33	+1070
14	70	1004.3	24	32	+1180
15	72	1003.7	23	32	+1330
16	72	1003.3	23	32	+1340

MARCH

HR	TEMP	PRESS	RH	DP	DA
07	52	1002.3	45	31	+070
08	54	1003.3	43	32	+180
09	59	1003.6	37	33	+510
10	64	1003.7	32	34	+380
11	68	1003.6	28	34	+1090
12	71	1003.2	24	33	+1290
13	73	1002.4	22	32	+1420
14	75	1001.5	21	33	+1590
15	75	1000.9	20	32	+1620
16	75	1000.4	20	32	+1630

APRIL

HR	TEMP	PRESS	RH	DP	DA
07	58	1001.4	38	33	+420
08	62	1001.9	34	34	+720
09	67	1002.2	29	34	+1070
10	72	1002.4	25	34	+1380
11	75	1002.4	22	34	+1570
12	78	1001.8	19	34	+1770
13	80	1001.2	17	32	+1920
14	81	1000.5	16	31	+1980
15	82	999.7	16	31	+2080
16	82	999.0	16	31	+2160

MAY

HR	TEMP	PRESS	RH	DP	DA
07	69	999.1	35	40	+1240
08	73	999.6	32	42	+1560
09	78	999.8	28	43	+1870
10	82	999.8	24	42	+2210
11	85	999.6	21	41	+2280
12	88	999.2	18	39	+2470
13	90	998.6	17	39	+2610
14	91	998.0	16	39	+2680
15	92	997.2	15	38	+2750
16	92	996.6	15	38	+2780

JUNE

HR	TEMP	PRESS	RH	DP	DA
07	76	997.2	36	47	+1780
08	81	997.7	33	49	+2130
09	85	997.9	29	49	+2380
10	89	997.9	25	49	+2620
11	92	997.7	21	47	+2780
12	95	997.4	19	47	+2980
13	97	996.8	17	45	+3110
14	99	996.2	17	47	+3250
15	100	995.5	16	46	+3340
16	100	994.5	15	44	+3330

JULY

HR	TEMP	PRESS	RH	DP	DA
07	85	998.4	45	61	+2420
08	88	998.9	41	61	+2610
09	91	999.1	37	61	+2770
10	95	999.1	34	63	+3030
11	98	999.0	31	62	+3190
12	100	998.6	27	60	+3320
13	102	998.0	27	62	+3470
14	104	997.3	25	61	+3610
15	105	996.5	24	61	+3680
16	105	995.8	24	61	+3710

AUGUST

HR	TEMP	PRESS	RH	DP	DA
07	83	998.0	52	64	+2370
08	87	998.5	47	65	+2580
09	90	998.7	42	64	+2730
10	93	998.8	37	63	+2910
11	97	998.7	34	64	+3150
12	99	998.2	30	63	+3280
13	102	997.5	29	64	+3480
14	103	996.8	27	63	+3580
15	105	995.9	26	63	+3680
16	104	995.2	26	63	+3680

SEPTEMBER

HR	TEMP	PRESS	RH	DP	DA
07	75	998.3	48	54	+1730
08	79	998.8	44	56	+1990
09	83	999.1	39	56	+2260
10	88	999.2	34	57	+2550
11	91	999.0	29	55	+2720
12	94	998.6	26	54	+2890
13	96	997.8	24	54	+3020
14	98	997.0	22	53	+3220
15	99	996.2	21	52	+3280
16	99	995.7	20	51	+3300

OCTOBER

HR	TEMP	PRESS	RH	DP	DA
07	61	1001.3	49	42	+630
08	64	1001.9	45	43	+930
09	69	1002.4	39	43	+1240
10	74	1002.4	33	43	+1560
11	78	1002.2	28	43	+1780
12	81	1001.7	25	42	+1980
13	84	1000.7	23	42	+2190
14	85	1000.0	21	41	+2290
15	86	999.5	20	41	+2340
16	86	999.2	20	41	+2370

NOVEMBER

HR	TEMP	PRESS	RH	DP	DA
07	52	1004.4	49	34	-120
08	53	1005.0	47	33	-040
09	57	1005.5	42	34	+280
10	61	1005.7	38	35	+570
11	66	1005.5	33	36	+910
12	70	1004.9	28	36	+1180
13	73	1003.9	26	36	+1420
14	74	1003.1	24	35	+1490
15	76	1002.7	24	37	+1630
16	75	1002.5	24	36	+1600

DECEMBER

HR	TEMP	PRESS	RH	DP	DA
07	42	1006.0	57	28	-880
08	42	1006.5	57	28	-810
09	46	1007.0	51	29	-580
10	51	1007.5	43	29	-220
11	55	1007.5	38	30	+020
12	58	1006.7	34	30	+320
13	61	1005.7	31	30	+580
14	63	1004.9	29	30	+720
15	64	1004.5	28	30	+780
16	64	1004.3	28	30	+790

2.1.9 Radiation. As expected from the low incidence of cloud cover and latitude of the Proving Ground, hourly solar insolation values are high throughout much of the year. The 1966-1974 data, Table 2 shows that from March to October, 38 percent or more of the hours receive at least 60 langleys of insolation. This is a large quantity of radiant energy, equivalent to 1.0 langley per minute, or half the solar constant (Solar constant is the rate at which solar radiation is received outside the earth's atmosphere on a surface normal to the incident radiation at a distance equal to the earth's mean distance from the sun). Intensities of 80 langleys or more occur from April through July. During summer months the total daily insolation is 700 langleys or greater. This is truly a massive amount of energy and explains in large part the high daily maximum temperatures, frequently above 100°F for these months.

Abundant sunshine is received at Yuma during the entire year. The greatest percentage of possible sunshine is recorded in spring and early summer (April thru June) when 94 to 98 percent is received. Winter (December thru February) is the season of least sunshine, but even during this period, 81 to 84 percent of the possible sunshine is received, with January recording the least, 81 percent. The mean daily hours of sunshine that Yuma receives a year is 10.82 hours, highest in the nation. Figure 2 shows the hours of possible and actual sunshine as received in Yuma, Arizona averaged for 42 years.

2.2 Surface and Terrain.[8] Topographically, Yuma Proving Ground is quite diverse. The form, arrangement, and material composition of the numerous surface features provide a variety of testing conditions. The elevation ranges from 200 to 2700 feet above mean sea level (MSL). Mountains cover approximately 24 percent of the installation, hills about 16 percent, and the remainder is generally flat desert pavement, sand plain, washes, and bottomland. The mountains are deeply eroded and taper into well developed, coalesced alluvial fans with detailed slopes and intervening valleys. The fans and apron areas are intensely dissected by intricate wash complexes.

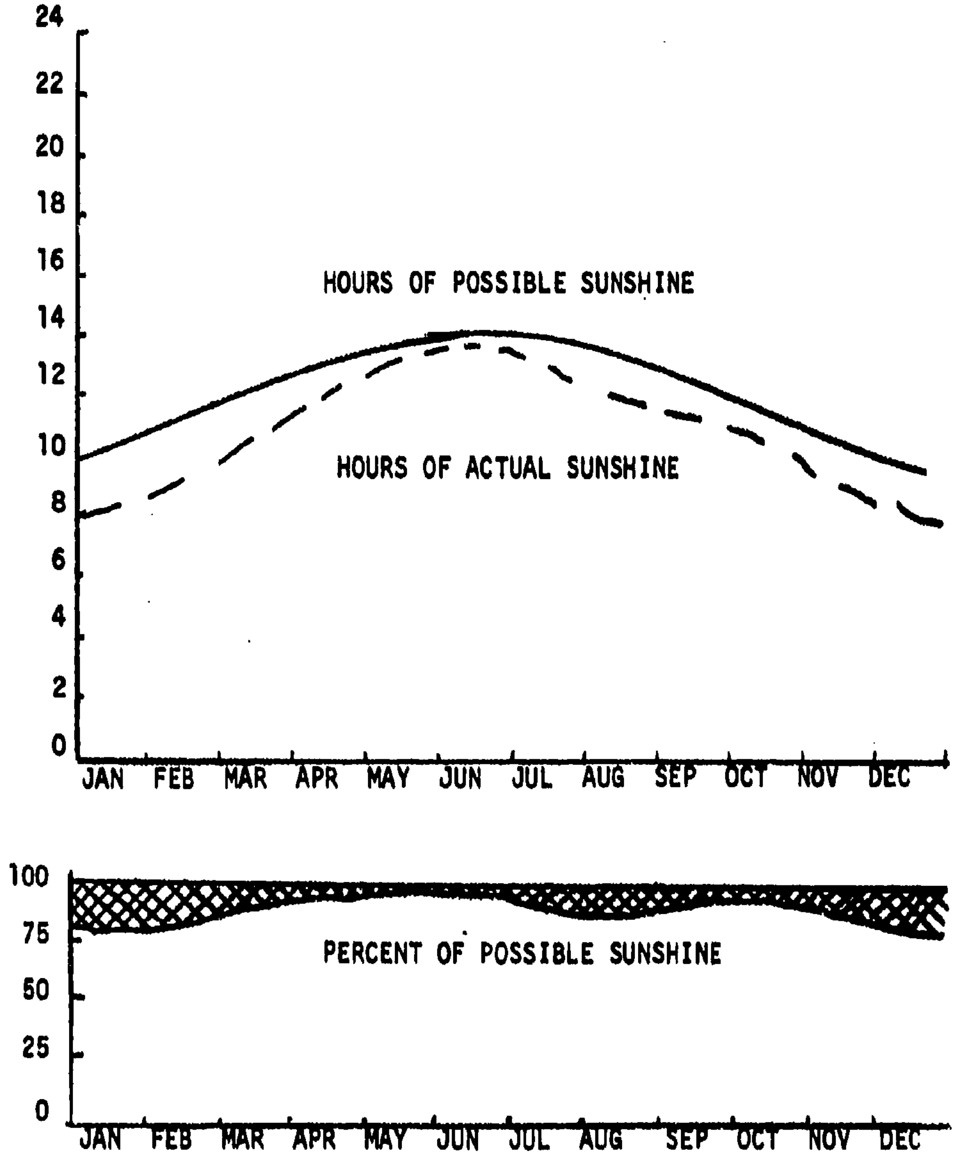
The soil types of half the installation are predominately coarse grained with a range of soil containing more than 90 percent gravel to that containing more than 90 percent sand. Over a quarter of the installation is characterized by mosaics of bare rock and stony soil with a few patches of coarse and fine grained soils. The remainder of the installation is made up of fine grained soils, predominately silt (Figure 3).

2.2.1 Vegetation.[9] The vegetation of Yuma Proving Ground includes types found in many deserts of the world, plus types indigenous only to North American deserts. Two principal biotic communities are present, the "creosote bush" and the "paloverde." The paloverde-sahuaro community is characterized by small-leaved desert (non-reparian) trees as well as shrubs and numerous cacti. The trees are primarily paloverde, ironwood, chollas, barrel cacti, mesquite, and sahuaro. The best development of

TABLE 2
HOURLY AVERAGE INSOLATION VALUES FOR USAYPG
PERIOD OF RECORD 1966 - 1974
(MEASURED IN LANGLEY'S)

HRS/MONTHS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
01												
02												
03												
04												
05												
06				1	3	4	4	2				
07		1	4	11	15	17	17	13	6	2		
08	6	12	19	28	33	33	32	29	22	15	7	5
09	20	28	35	47	50	50	48	46	40	32	32	17
10	33	42	50	63	66	65	62	61	55	47	36	30
11	42	53	62	74	77	76	71	71	66	58	46	39
12	47	59	68	81	82	81	76	76	73	63	51	44
13	47	59	68	81	83	82	78	76	72	62	51	44
14	42	54	62	76	78	78	73	70	67	57	46	39
15	32	43	52	65	68	68	64	61	57	45	35	30
16	20	28	38	50	53	55	51	47	42	30	21	18
17	6	12	21	30	35	37	34	30	24	17	7	5
18		1	5	12	17	20	18	13	7	2		
19				1	3	5	4	1				
20												
21												
22												
23												
24												

VERTICAL EPPLEY RADIATION - Pyrheliometer exposed with sensor plate parallel to the horizon.



Hours of possible sunshine were computed for the sixteenth day of the month for Latitude 32 45'N.

FIGURE 2

this community is attained on rocky hills, bajadas, washes, and other coarse-soiled slopes. The creosote bush-bur sage community is composed mainly of shrubs and dwarf shrubs which are found on sandy soil. Shrubs can endure long periods of drought by remaining dormant. Total vegetation cover on the proving ground typically ranges from 5 to 20 percent.

2.2.2 Soils.[10] All the soils on the Proving Ground are classified by the Soil Conservation Service, Department of Agriculture, as "hyperthermic arid", indicating that they occur in and as a result of an environment which has a mean annual soil temperature of at least 22.2°C (72°F), more than -12.8°C (9°F) difference between mean summer and winter temeratures at a depth of 50.8 cm or to bedrock, and which has precipitation to support only sparse strands of desert shrubs, a few trees, and perennial grasses.

The soil environment is relatively unchanging as long as man-made disturbances and diversions to the natural surface are minimal. Soils are thin and stony in the bedrock mountains and thick in the intervening lowland basins. Gravelly materials predominate everywhere on the installation except in the La Posa Plain, King Valley, and the southwestern areas including the drop zones, Mobility Complex, Laguna Army Airfield, and adjacent land south to the Laguna Mountains. In these latter areas, fine to very fine sands alternate with layers of clay (often expansive) and thin layers and lenses of rounded pebble gravels; gravelly deposits blanket the finer materials near the mountains.

2.2.3 Sand and Dust.[11] The characteristics of dust environment are of interest because of the potential for this condition to cause rapid failure of many types of military equipment, reduction of visibility, and electrostatic charge buildup. Particle size and agglomeration are the two prime characteristics of a soil which establish dustiness of an area. Particle size determines floatation of the cloud, affects type of filter used and the amount dust entering sealed containers. The majority of air borne dust is less than 74 microns in diameter. Dust cloud concentration varies almost directly with the percentage of 74 micron particles.

Dust samples from Yuma Proving Ground contain a large percentage of quartz, approximately 40 percent with the remainder of nonabrasive material, viz., clay, gypsum, and carbonate. Particle size varies mostly between 40-70 microns of varied angular shapes.

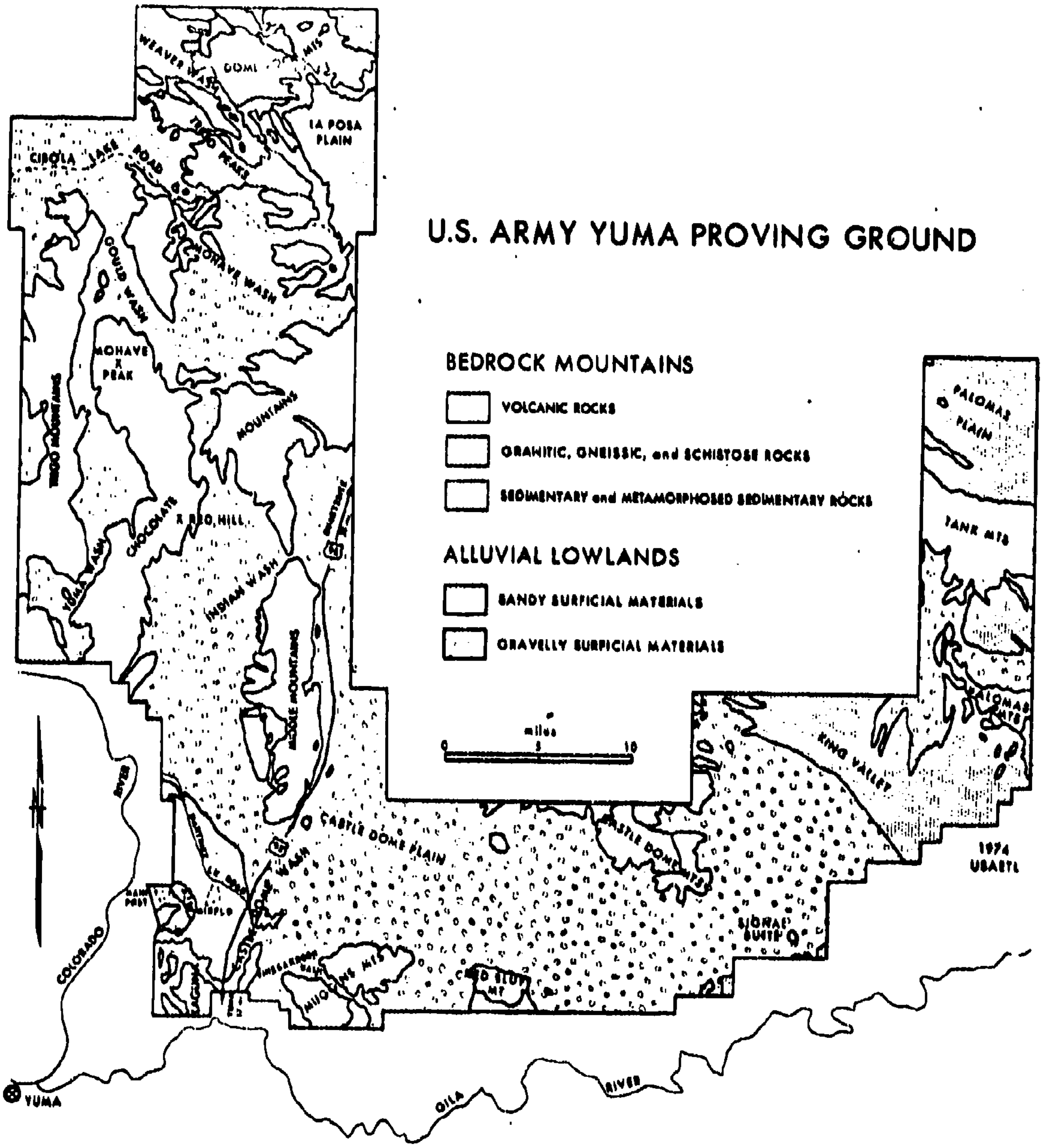


FIGURE 3 GENERALIZED DISTRIBUTION OF SURFACE MATERIALS

Section 3 - Human Performance Under Desert Conditions

3.1 Physiological. The principal physiological stress placed upon an individual by typical desert heat conditions is the maintenance of normal body temperature. A resting body completely insulated against heat exchange will increase body temperature 2°C (3.6°F) per hour through internal processes. This increase in internal body temperature is correlated with loss of body liquids as well as metabolic heat production. In addition, at 37.8°C (100°F) the solar radiation from the midday sun adds about 183 calories an hour to man's thermal load, and at 43.3°C (110°F) the increase is over 210 calories per hour. Such increases in body heat when added to the other heat sources may severely tax the body's temperature maintenance mechanism, especially if metabolic heat production is high.

The only mechanism the body has to regulate temperature is evaporation of perspiration, which is facilitated by the dryness of the desert atmosphere. Where an adequate supply of water is present, perspiration rates in acclimatized men are nearly proportional to the heat production in the body. An insufficient intake of liquids or heavy exertion will result in a rapid increase in body temperature leading to exhaustion or collapse.

Acclimatization is a necessary process of physiological adaptation to the desert. On the average, this process takes about eight days to be nearly complete.

3.2 Psychophysical.[12] The principal human sense affected by desert conditions is that of vision. Numerous anecdotal reports indicate that although visibility in the desert is unrestricted, it is quite deceptive. During the heat of midday, contours of objects are unclear and it becomes very difficult to differentiate between targets, trucks are mistaken for tanks, and stationary vehicles for moving.

The primary characteristic of desert vision conditions is the intense brightness levels reached during the day. Table 3 indicates some typical outdoor brightness values.

Table 3
Typical Midday Outdoor Brightness

	FootLamberts
Brightest sunlit cloud	9,000
Sandy beach, dry	4,500
Barren soil, light	1,800
Hazy sky	1,800
Green grass in sun	700
Dark soil, dry	675

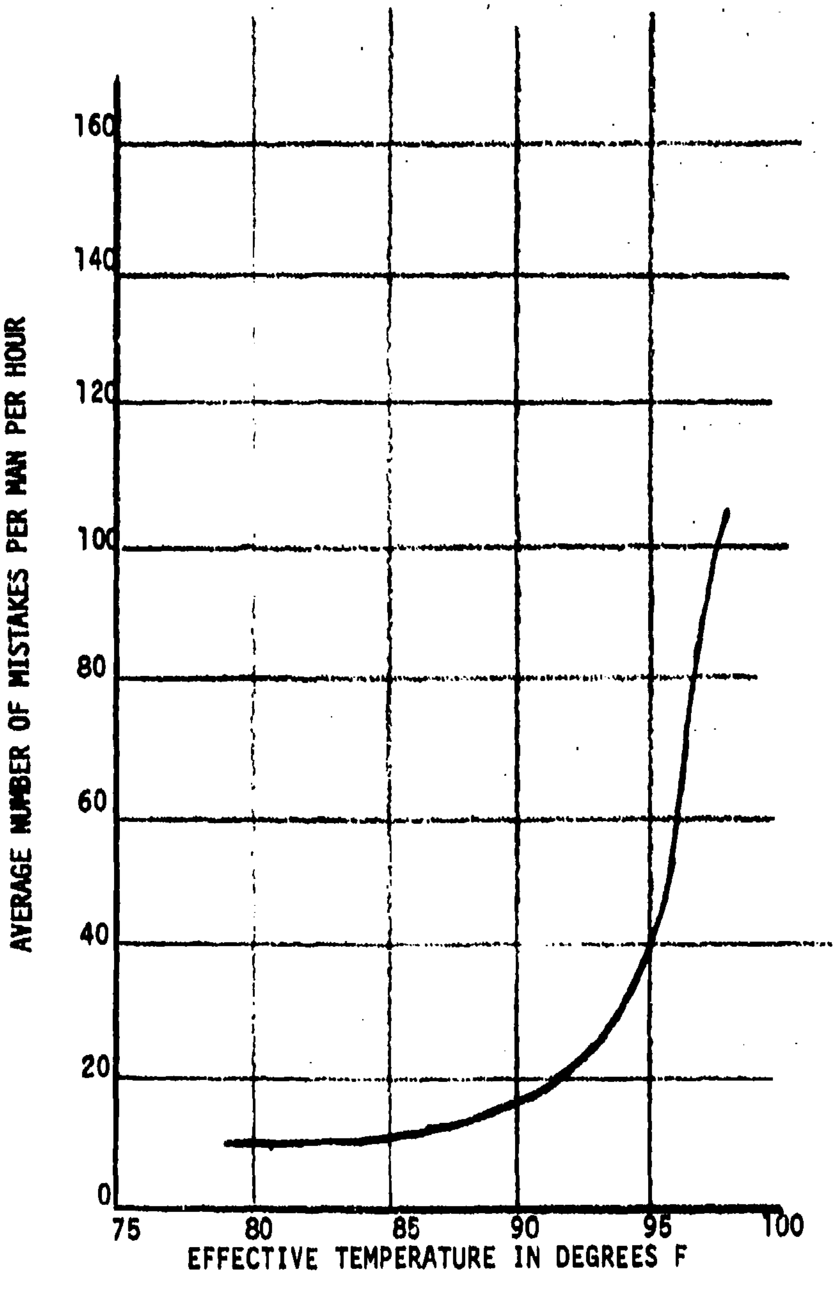
These high brightness or reflected illumination levels produce a condition of glare and in conjunction with atmospheric disturbances such as shimmer, boil, mirages, and haze tend to lower contrast of distant objects. These factors, together with the open, unrelieved nature of the desert terrain, make for increased difficulties in depth perception and distance judgement.

Another result of the high levels of illumination in the desert is the rate of dark adaptation of previously light adapted personnel. This can reduce the effectiveness of such personnel during a considerable period after sunset for operations requiring acute night vision.

Another factor which diminishes sense-of-sight efficiency is the refraction of the light waves due to heat. When magnification is used in the form of fire control equipment or telescopes, the heat waves are magnified and appear to distort vision even more. Targets at 1550 meters could not be resolved by observers using 20-power telescopes due to the shimmering effects. Accurate ranging therefore is almost impossible using optical equipment during the high midday desert temperatures.

3.3 Psychomotor and Mental. The effectiveness of a man's work obviously depends upon the skill with which he can control his muscles and mental processes. High temperature is the most important factor in reducing the operational efficiency of personnel under desert conditions. The maximum limit of air temperature before human performance is adversely affected is about 29.4°C (85°F) effective temperature (ET) which corresponds to a temperature of 40.6°C (105°F) at 20% relative humidity. Figure 4 shows the relation of human performance to effective temperature.[13] Midday desert ambient temperatures quite often are in excess of this limit. With the high desert ambient temperatures 49°C (120°F) and the effect of intense solar radiation, crew compartment temperatures can reach 65.5°C (150°F) with hatches closed. These high internal temperatures without adequate ventilation will result in greatly reduced performance effectiveness or, even worse, make the interior compartment uninhabitable.

Threshold sensitivity to thermal pain according to Lewenstein and Dallenbach, was found to be about 46.7°C (116°F). Above this temperature, handling equipment requires wearing insulating gloves which reduces operators' finger dexterity and sensitivity. The external and internal surfaces of vehicles and equipment reach temperatures far in excess of this limit. Table 4 shows some typical temperatures for equipment under desert conditions.



160
140
120
100
80
60
40
20
0
AVERAGE NUMBER OF MISTAKES PER MAN PER HOUR
75
80
85
90
95
100
EFFECTIVE TEMPERATURE IN DEGREES F

FIGURE 4

Table 4 Typical Maximum Equipment Temperatures [14]

		At 49°C (120°F)
Surface Temperatures		
Floor Board:	¼-ton Truck	60.5°C (141°F)
	8-ton Goer	65°C (149°F)
Inside Cab:	8-ton Goer	57.2°C (135°F)
Accelerator Pedal:	¼-ton Truck	58.3°C (137°F)
	5-ton Truck	63.9°C (147°F)
Engine Cover (cab over):	2½-ton Truck	86.7°C (188°F)
	5-ton Truck	82.2°C (180°F)
Inside Turret:	SP Howitzer	65.6°C (150°F)
	Light Tank	63.9°C (147°F)
	Medium Tank	61.1°C (142°F)
Air Temperatures		
Crew Compartment:	5-ton Truck	62.8°C (145°F)
	5-ton Goer	62.2°C (144°F)
	APC	56.7°C (134°F)
	SP Howitzer	65.6°C (150°F)
	Light Tank	52.2°C (126°F)
	Medium Tank	53.9°C (129°F)
	Heavy Tank	62.2°C (144°F)

Next to heat, the dust and sand conditions of deserts have a strong effect on operational efficiency. The presence of large quantities of dust, as in a convoy moving down an unpaved road, reduces driver's visibility, affects the accuracy of gun laying, and increases the physical distress of the vehicle occupants.

Section 4 - Desert Operations

The arctic, tropic, and desert areas of the world all have one thing in common: conditions of extreme environment. These environments impose severe stresses on men, material, and materiel. The causative factors producing these stresses are different for each of these environments, but the end result is frequently the same--failure of materiel to function as designed. The prime factors imposing environmental stresses in the desert are the thermal stresses caused by solar radiation and ambient temperatures and the physical and mechanical stresses caused by blowing sand and dust.

4.1 Heat Stress. Generally, hot-dry climates do not cause rapid deterioration of mechanical equipment. However, certain elastomers, textiles, leathers, chemicals, and plastics are susceptible to accelerated deterioration when subjected to high temperatures and intense solar radiation over a period of time.

The temperature a material will attain under direct solar radiation depends on its heat capacity, thermal conductivity, and reflective characteristic. Table 5 presents the temperatures of some materials exposed to direct solar radiation at Yuma.[15]

Table 5
(Measurements recorded at stated ambient conditions)

	Temperature
Ambient Air	47.5°C (108°F)
Ground Temperature	70.0°C (144°F)
Surface of a 105 mm HE round	71.2°C (146°F)
(propellant inside)	62.5°C (132°F)
175 mm round standing on end	65.6°C (137°F)
Steel rocket container painted blue	76.2°C (154°F)
Steel rocket container painted white	59.4°C (127°F)
Wooden box	57.5°C (124°F)
M60 tank exterior surface	73.7°C (150°F)

In all cases the temperatures of material exposed to direct solar radiation exceeded ambient. However, a tarpaulin shade raised seven inches above a round to allow air movement prevented temperatures from going higher than ambient. The intense solar radiation, besides causing high thermal stresses in materials, also contributes to high ground temperatures. Midday temperatures greater than 60°C (140°F) occur on both sand and desert pavement surfaces. The absolute maximum hourly temperatures recorded were 64.4°C (148°F) on sandy soil and 65.6°C (150°F) on desert pavement. The temperature extremes in the soil lag behind the extremes at the surface so much that the highest temperatures at 25-centimeters depth occurs near midnight. Therefore, as the surface of the desert sand cools down at night, subsurface temperatures are still high. The extreme

ground temperatures experienced in the desert can have a significant effect on buried mines. Temperatures of mines buried in desert soil increased to 58.9°C (138°F). This high temperature can cause changes in chemical properties of the explosive resulting in item malfunction.

Another facet of the solar radiation problem is that of high temperatures during storage. Studies have shown that the standing boxcars and the tarpaulin-covered storage modes were situations favoring maximum heat accumulation. The air near the top surface of the boxcar reached a temperature of 66.7°C, (152°F). Cartons stored in the boxcar achieved a maximum temperature of 44.4°C (112°F) for the bottom carton. The load inside the boxcar retained temperatures in excess of 37.8°C (100°F) for over 14 hours. Materials subject to chemical reaction, such as propellants and explosives, may be markedly affected by extended storage in such heated boxcars.

4.2 Mechanical Stress. The characteristics of dust environment are of interest because of the potential for this condition to cause rapid failure of many types of Army equipment. The Advent of faster vehicles, helicopters, and ground launched missiles intensify the dust problem. The sand and dust phenomena are not only associated with desert areas but also with temperate and tropic areas as well. Generally all areas have dry periods, when sand and dust play havoc with military equipment. The dust environment is usually a result of vehicular or personnel activity on the surface. Minor dust conditions can be a result of climatic conditions, however, the frequency is negligible when compared to man-made dust clouds.

4.2.1 Particle Size and Distribution. The size of a dust particle (expressed in microns) is usually understood to be the effective diameter of the dust particle since dust particles do not have a definite shape. Particle size bears directly on dust formation and airborne dust movements.

Particle size distribution is represented as the percent of a dust sample smaller than a given dust particle diameter. The size distribution is relatively indicative of the composition of the surface soil material since particles of least density and size will become available to the dust plume under moderate conditions. When a surface soil is composed of two or more basic soil materials, the particle size distribution will indicate this distribution with a double distribution curve. For a clay-quartz soil the distribution below approximately 30 microns is indicative of clay particles with those over 30 microns constituting quartz particles. Table 6 shows the distribution and compostion of dust particles from YPG vehicle test courses. The values are averages from several test samples obtained from different courses.

Table 6
Particle Size Distribution YPG Dust Course

Particle Size (microns)	Percent by Weight	Composition	
0 - 10	4.33	non-abrasive (82%)	abrasive (18%)
11 - 20	2.88	clay, gypsum,	quartz
21 - 40	3.47	carbonate	
41 - 74	3.82	non-abrasive (31%)	abrasive (69%)
75 - 149	21.28	clay, gypsum,	quartz
150 - 250	22.85	carbonate	
over 250	41.37		

As the table shows, abrasive content of the dust increases with particle size. YPG vehicle test courses are composed primarily of larger size dust particles.

4.2.2 Dust Concentration. One of the most important aspects of dust environment is concentration. The dust concentration measured near or directly on a moving vehicle is primarily a function of terrain, vehicle type, vehicle speed, and climatic conditions. It is usually measured as a weight of particles per unit volume. The methods and techniques employed in obtaining and measuring dust concentrations are important in the accuracy of concentration data. Several factors that influence concentration data include sampling period, location of samples, type of filter, and climatic data.

Only the surface soil layer is responsible for the dust environment. Any mechanical or aerodynamic force which causes this surface layer of soil to be agitated or moved is a dust generating mechanism. As a result, dust concentrations are not constant but vary over time. Peak concentration occurs shortly after a vehicle passes over the soil, and depending on particle size distribution, the rate at which dust concentration diminishes is a function of the square of the particle diameter. Relatively large particles descend much faster than smaller particles: 40-74 microns at one foot per second; 150 microns in 3 feet per second and 5 microns at 0.01 feet per second. This wide variation in dust settling rate is highly important in dust sampling. Dust concentrations for various levels of activity are shown in Table 7.

Table 7
Dust Concentrations to which Armored Personnel are Exposed

OPERATIONS	DUST CONCENTRATION BY WEIGHT (grams/cu. ft.)
MINIMUM ACTIVITY	
Dust Storm	.015 - .30
Airborne dust from infantry camp; some from a road grader	.0003
Motor pool of a medical battalion; slow traffic	.0004
Bivouac area, Sunday afternoon; fresh breeze	.001
Div. Sug. Tent. Hdqrs., camp area	.001
Air base; planes taking off clean runway	.001
Motor pool; ambulance driving in loose sand	.001
Infantry training on regt. parade ground	.001
Ordnance unloading depot, only 3 vehicles moving	.001
Army truck road, dust raised by staff car	.001
Regimental area of camp, normal traffic	.001
Gas dump, no vehicular movement, light to no breeze	.001
Railhead with light traffic, no convoy movements	.001
Repeated passage of ¼ ton truck on tank trail	.001
Railhead with little traffic	.001
Hdqrs. camp, light traffic, fresh breeze	.001
Ordnance unloading depot; heavy wind storm; no traffic	.001
MODERATE ACTIVITY	
Infantry column, 4 companies ahead of sampler	.002
In convoy behind half-track	.002
Asst. driver's seat; light tank midway of column of tanks	.002
Evacuation hospital area; sandy surface, fresh breeze	.002
Corner tank battalion motor pool; 16 tanks and 1 truck moved	.002
Entrance to railhead; almost continuous truck traffic	.002
Troop drilling--no traffic	.002

HIGH ACTIVITY

Maneuver road; dust raised by staff car	.003
Convoy of cargo trucks spaced 100 yards	.003
From ¼ ton truck and wind-blown dust	.004
Deliberate dust disturbance by ¼ ton truck	.004
Convoy of trucks and towed 75 mm guns	.005
Repeated passage of ¼ ton truck through pulverized silt bed	.006
Alongisde moving tank column	.037
Inside tank following another 150 yards	.009
Convoy of trucks passing by	.010
Following ¼ ton truck	.018
Thirty feet behind half track; loose sand	.029

Section 5 - Desert Maintenance

Equipment maintenance is highly critical in desert operations. Organizational maintenance cannot be overlooked; it is at this stage that serious damage and failure can be avoided by detecting and correcting minor deficiencies which could lead to a major breakdown. Gen. Charles L. Scott after WWII said,

> ". . . Anyone who doesn't believe in stressing motor maintenance or in providing liberally for it in armor or mechanized units should take a trip to the desert and become converted. It is littered with millions of dollars worth of tanks and motor vehicles, many of which could have been saved by preventive maintenance. . ."

The excessive heat, abrasive materials of the sand/dust, and rugged terrain of the desert environment are constantly at work to disable equipment. One of these factors alone could put a vehicle out of action. However, together and acting simultaneously, they represent a formidable obstacle to military equipment operation.

5.1 Heat. The high temperatures encountered in the desert prevent adequate heat dissipation of the cooling and lubricating system of vehicle engines. When a cooling system becomes ineffective it can adversely affect the lubricating system and vice versa. Temperatures in excess of 107.2°C (225°F) have been recorded for engine oil during operation. Therefore, particular attention should be given to vehicle cooling systems as overheating is a major problem in desert operations. The operator should frequently check the temperature gauge. Liquid cooling systems should be flushed and cleaned frequently. Distilled water should be used if possible, and a coorosion inhibitor should be added. The coolant level needs checking often due to the high evaporation rate in the desert. The radiator pressure caps should be checked for proper operation, as one pound of pressure raises the boiling point approximately three degrees. The exterior of the radiator should be cleaned to prevent the accumulation of sand and dust which restricts airflow and impedes cooling. Hoses deteriorate more rapidly in the desert due to extreme heat. They should be inspected at more frequent intervals than those prescribed in the technical manuals. Fan belts deteriorate rapidly and should be checked for cracks and breaks. Spares should be available.

Frequent bleeding of hydraulic systems may be required to maintain pressure. This is due to the great diurnal temperature variations experienced in the desert. A 40-degree difference between morning and afternoon temperatures is not unusual.

Excessive temperatures can be generated by a combination of ambient heat, radiation and friction. Rubber tires and track pads have been known to blow out due to concentration of heat above 121°C (250°F) in the interior rubber.

Batteries must be given special care by having water levels checked frequently due to excessive evaporation. Overcharging will result in higher evaporation

rate; therefore, voltage regulators should be set to lowest practical charging rate.

5.2 Sand/Dust. The adverse effect of the desert environment on maintenance requirements of armament and individual weapons is primarily due to blowing sand and dust. Moving parts in the recoil mechanism, brakes, and elevating and traversing mechanisms can easily become contaminated by abrasive particles. This will lead to higher rates of wear for the affected parts. In small caliber weapons, sand and dust will cause clogging, and jamming. Lubrication will compound the problem due to formation of abrasive paste. Therefore, weapon systems should be kept dry and clean if possible. If the weapon is not being used, it should be covered to protect vulnerable parts.

Relays and contactors are easily contaminated by sand and dust preventing contacts from closing. Fixed equipment, such as stationary engines, generators, compressors, pumps, and machine tools, also suffer from the abrasive effects of windblown sand and dust. Rings are worn, cylinders scored, commutators scratched, and bearings damaged. Frequent inspection and cleaning of air filters and protective screening is required. A higher than normal replacement rate should be anticipated and replacement parts kept on hand.

Erosion of helicopter rotor blades and turbine engine compressor blades may be a significant problem during desert operation. Numerous metallic and plastic compounds have been tried to reduce rotor erosion but with little success. The only sure method to alleviate high rotor replacement is by limiting low level hovering and using surfaced helipads.

The infiltration of sand and dust occurs even in the most minute openings. This ability of fine-grained material to enter areas poses a severe problem to stored electronic equipment and delicate aircraft instrumentation which requires the exclusion of foreign material. Extreme care should be exercised when working with such materiel.

Impact of windblown particles produces large electrostatic voltages. An electrostatic charge of as much as 150,000 volts was produced in Saudi Arabia during a severe dust storm. Proper grounding of equipment should be insured prior to handling.

All maintenance should be performed in a protected environment to prevent contamination as much as possible. Tasks which require exposure of lubricated surfaces, should not be performed under adverse conditions.

5.3 Terrain. The rocky nature of many desert areas causes severe vibration problems on vehicles and transports. Frequent inspection should be made of all air lines, bolts, nuts, etc. to insure proper tightness.

Tires of dual-wheeled vehicles must be inspected more frequently after driving through rock covered areas, to remove any lodged rock particles and to insure that the tires are properly inflated. A flat tire on one of the dual wheels will not be noticed while driving and could result in premature failure of the other tire if load is excessive.

ANNEX A

Climatic Elements

of

World Deserts

A -1

Middle East

LOCATION OF STATIONS USED IN TABLES OF MONTHLY VALUES

Station and Country	Elevation (feet)	Latitude (North)	Longitude (East)*	Years of Record
Aden (Aden Protectorate)	94	12° 45'	45° 04'	25-50
Baghdad (Iraq)	120	33° 21'	44° 26'	27-34
Bahrein (Bahrein Island)	18	26° 12'	50° 30'	3-13
Basra (Iraq)	10	30° 28'	47° 51'	18-20
Damascus (Syria)	2362	33° 30'	36° 18'	4-9
Eilat (Israel)	6	29° 33'	34° 57'	5-8
Jaffa (Israel)	66	32° 04'	34° 47'	8-11
Jericho (Jordan)	-845	31° 51'	35° 27'	11
Jidda (Saudi Arabia)	20	21° 30'	39° 22'	10
Muscat (Oman)	20	23° 37'	58° 35'	18-38
Yuma (USA)	206	32° 40'	114° 36'	40-79

*Yuma longitude is West

Table 1: MEAN MONTHLY TEMPERATURE (°F)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Aden	76	77	79	83	87	90	88	86	88	84	80	77	83
Baghdad	49	54	61	70	81	90	94	94	88	78	63	52	73
Bahrein	61	62	68	76	84	88	91	92	88	82	74	65	78
Basra	52	57	65	74	84	90	93	92	88	73	67	56	75
Damascus	44	48	56	62	70	77	80	81	75	68	59	48	64
Eilat	60	61	67	76	84	87	90	91	88	80	72	63	77
Jaffa	54	55	59	64	68	73	77	79	77	74	65	58	67
Jericho	59	60	67	73	82	86	89	90	86	81	72	62	76
Jidda	73	72	77	80	83	85	87	88	86	84	80	77	81
Muscat	71	71	77	84	91	93	91	87	87	85	79	73	82
Yuma	55	59	64	70	77	85	91	90	85	73	62	55	72

Table 2: MEAN DAILY MAXIMUM TEMPERATURE (°F)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Aden	85	86	88	93	95	97	94	93	95	92	91	86	91
Baghdad	59	65	73	83	94	104	109	110	103	92	75	63	86
Bahrein	66	67	73	81	90	93	97	98	94	89	80	71	83
Basra	60	65	74	84	94	101	104	105	101	91	77	64	85
Damascus	52	57	68	75	84	92	96	97	91	81	69	56	76
Eilat	70	72	79	88	96	101	103	105	99	91	84	74	88
Jaffa	63	64	70	75	79	83	86	88	87	85	75	68	77
Jericho	68	70	80	87	97	101	103	103	100	94	83	72	88
Jidda	77	77	82	85	88	91	92	93	91	89	85	81	87
Muscat	75	76	81	89	96	98	95	91	91	91	84	78	87
Yuma	67	72	78	86	93	102	106	104	100	88	76	68	87

Table 3: MEAN DAILY MINIMUM TEMPERATURE (°F)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Aden	73	75	76	79	83	86	82	82	83	78	75	74	79
Baghdad	38	43	49	58	68	75	79	78	72	63	50	42	55
Bahrein	56	57	63	70	78	83	85	86	82	76	69	60	72
Basra	44	48	56	65	74	80	81	80	74	66	56	48	64
Damascus	37	40	44	49	55	63	64	65	59	55	48	40	52
Eilat	49	50	55	64	71	74	78	78	76	69	61	52	65
Jaffa	46	46	49	53	57	63	67	69	66	63	54	49	57
Jericho	50	51	55	60	67	72	75	76	73	69	61	53	64
Jidda	68	67	71	75	77	79	82	83	81	78	75	71	76
Muscat	66	67	72	79	85	88	87	84	83	80	74	69	78
Yuma	42	46	50	54	60	68	77	77	70	58	48	44	58

Table 4: ABSOLUTE MAXIMUM TEMPERATURE (°F)

Years Record		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
50	Aden	92	91	98	101	102	109	109	107	102	101	97	93	109
34	Baghdad	80	85	99	108	113	119	123	121	116	107	94	81	123
12	Bahrein	83	83	95	98	109	107	107	107	105	105	93	84	109
20	Basra	80	87	93	109	115	119	122	121	116	105	94	81	122
9	Damascus	69	86	83	95	101	104	108	113	102	99	86	69	113
—	Eilat	-	-	-	-	-	-	-	-	-	—	-	-	-
10	Jaffa*	80	82	98	102	103	112	96	106	106	105	96	82	112
11	Jericho	84	88	100	109	116	118	114	117	117	107	99	85	118
10	Jidda	91	94	98	100	107	115	103	100	112	100	95	89	115
38	Muscat	87	96	107	110	112	116	113	109	109	105	96	92	116
75	Yuma	84	92	100	107	120	119	120	119	123	108	96	83	123

*Tel Aviv used on map because of higher maximum value (114°).

Table 5: ABSOLUTE MINIMUM TEMPERATURE (°F)

Years Record		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
50	Aden	65	61	67	69	70	73	70	63	71	70	68	63	61
34	Baghdad	19	22	27	41	47	63	68	65	53	43	25	19	19
12	Bahrein	41	45	51	57	65	72	74	79	74	56	53	43	41
20	Basra	24	31	39	50	59	69	66	68	45	49	36	30	24
9	Damascus	21	23	28	33	43	48	54	55	40	42	28	23	21
-	Eilat	-	-	-	-	-	-	-	-	-	-	-	-	-
10	Jaffa	32	32	34	40	45	51	60	63	57	51	40	37	32
11	Jericho	36	37	41	48	50	59	67	70	64	57	46	36	36
10	Jidda	55	56	59	63	63	71	72	74	66	72	65	61	55
38	Muscat	51	49	58	66	75	78	77	75	72	63	55	51	49
75	Yuma	22	25	31	38	39	50	61	58	50	38	29	22	22

Table 6: MEAN DEWPOINT TEMPERATURE (°F)*

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Aden	67	69	71	75	79	80	80	77	80	74	70	68
Baghdad	32	32	29	38	37	41	50	39	38	37	40	36
Bahrein	55	56	60	66	71	74	76	81	78	74	67	59
Basra	46	50	55	60	67	70	68	71	70	63	56	50
Damascus	39	42	-	-	-	-	59	65	63	-	53	44
Eilat	41	41	44	46	52	51	59	55	58	55	49	43
Jaffa	47	47	-	-	-	-	74	-	-	-	-	49
Jericho	49	49	51	49	57	61	64	66	66	63	57	50
Jidda	61	59	66	68	71	74	77	77	77	75	69	66
Muscat	60	60	65	72	79	78	78	80	78	72	67	61
Yuma	32	33	35	37	42	47	59	64	57	47	36	34

*Figures for all stations except Yuma are approximate, based upon relations between mean monthly temperatures and relative humidities for given hours.

Table 7: AVERAGE PRECIPITATION (INCHES)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Aden	.30	.20	.40	.20	.10	.10	.03	.10	.10	.10	.10	.10	1.83
Baghdad	1.17	1.32	1.34	.93	.23	.00	.00	.03	.01	.08	.74	1.23	7.08
Bahrein	.40	.70	.50	.20	.10	.00	.00	.00	.00	.01	.20	.80	2.91
Basra	1.40	1.10	1.10	.50	.30	.00	.00	.00	.10	.10	.90	1.30	6.80
Damascus	1.57	2.09	.24	.35	.04	.00	.00	.00	.08	.16	1.22	1.46	7.21
Eilat	.07	.13	.23	.03	.06	.00	.00	.00	.00	.02	.07	.28	.89
Jaffa	5.50	3.20	1.89	.61	.07	.00	.00	.00	.07	.49	2.49	5.84	20.16
Jericho	1.49	1.17	.69	.45	.13	.00	.00	.00	.00	.15	.79	1.50	6.37
Jidda	.90	.00	.00	.00	.04	.00	.00	.00	.00	.00	1.60	.60	3.14
Muscat	1.10	.70	.40	.40	.00	.10	.04	.04	.00	.10	.40	.70	3.98
Yuma	.39	.42	.32	.09	.03	.01	.19	.58	.40	.26	.23	.47	3.39

Table 8: PREVAILING WIND DIRECTION AND AVERAGE SPEED (MPH)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Aden	NE10	NE10	NE15	NE15	NE10	NE5	SE7	SE10	NE10	NE10	NE10	NE10
Baghdad	N5	N5	N5	NW5	N5	NW10	NW10	NW10	NW5	N5	N5	N5
Bahrein	NW5	NW5	NW5	NW5	NW5	NW5	NW3	NW2	NW2	NW2	NW5	NW5
Basra	N2	N2	S2	N2	N2	NW5	NW4	W2	W2	W2	W2	W2
Damascus	-	-	-	-	-	-	-	-	-	-	-	-
Eilat	-	-	-	-	-	-	-	-	-	-	-	-
Jaffa	-	-	S	SW	W	SW	SW	SW	SW	SW	S	-
Jericho	-	-	NE5	NE5	NE5	NE5	NE5	NE5	NE5	NE5	NE5	-
Jidda	N5	N5	N10	N5	N5	N5	N5	NW5	NW5	NW5	N5	N5
Muscat	NW2	NW2	NW2	NW2	NW2	NW2	SE2	SE2	SE2	NW2	NW2	NW2
Yuma	N6	N6	W7	W7	W6	SW6	SW6	S6	SW5	N5	N5	N5

Table 9: AVERAGE CLOUDINESS (TENTHS OF SKY COVERED)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Aden	5.9	5.8	4.7	4.0	3.5	3.5	4.1	4.0	3.9	2.4	3.3	5.0	4.2
Baghdad	2.8	2.7	2.9	2.1	1.6	0.3	0.1	0.3	0.5	1.5	1.9	2.3	1.6
Bahrein	2.9	2.2	2.1	1.5	1.2	0.3	0.3	0.6	0.3	0.5	1.1	2.7	1.3
Basra	4.0	3.8	3.3	3.2	2.1	0.1	0.3	0.2	0.3	1.4	2.6	4.0	2.1
Damascus	5.8	5.5	-	-	-	0.4	0.2	0.4	0.3	3.1	5.7	5.9	-
Eilat	-	-	-	-	-	-	-	-	-	-	-	-	-
Jaffa	-	-	-	-	-	-	-	-	-	-	-	-	-
Jericho	4.1	4.2	2.8	2.4	1.6	0.6	0.6	0.4	0.8	1.2	2.3	3.8	2.1
Jidda	4.1	2.1	2.4	1.1	2.0	0.7	1.7	1.5	1.9	1.7	3.4	2.7	2.1
Muscat	3.1	2.6	2.4	1.7	0.7	2.0	3.5	3.2	1.3	0.7	1.5	2.6	2.1
Yuma	2.3	2.4	2.1	1.5	1.1	0.6	1.6	1.8	1.1	1.2	1.6	2.4	1.6

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Northeast Africa

STATIONS USED IN TABLES OF MONTHLY VALUES

Station and Country	Elevation (feet)	Latitude (North)	Longitude (East)*	Years of Record
Alexandria (Egypt)	105	31° 12'	29° 53'	34-51
Aswan (Egypt)	328	24° 02'	32° 53'	34
Bilma (Fr. West Africa)	1,171	18° 41'	12° 55'	5-10
Cairo (Egypt)	67	30° 03'	31° 15'	26
El Azizia (Libya)	518	32° 32'	13° 01'	11
Khartoum (Sudan)	1,280	15° 37'	32° 33'	33-36
Port Sudan(Sudan)	18	19° 37'	37° 13'	29-30
Quseir (Egypt)	23	26° 08'	34° 18'	8
Siwa (Egypt)	-75	29° 12'	25° 29'	10-20
Tripoli (Libya)	56	32° 54'	13° 11'	19-20
Yuma (USA)	206	32° 40'	114° 36'	40-78

*Yuma longitude is West

TABLE 1: MEAN MONTHLY TEMPERATURE (°F)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Alexandria	58	59	62	67	72	76	79	81	79	76	69	[illegible]	[illegible]
Aswan	63	65	72	81	88	92	93	92	89	84	74	[illegible]	[illegible]
Bilma	61	66	75	83	91	92	91	90	88	82	72	[illegible]	[illegible]
Cairo	56	58	64	70	76	82	83	83	79	75	68	60	71
El Azizia	52	56	63	69	76	82	82	87	86	77	66	56	71
Khartoum	73	75	81	87	92	93	90	88	90	89	82	74	84
Port Sudan	74	74	76	80	85	90	94	95	90	85	81	77	83
Quseir	64	65	70	74	80	85	86	87	84	80	75	67	76
Siwa	58	56	62	69	77	83	85	84	80	74	65	56	70
Tripoli	54	56	60	65	69	74	79	80	78	74	65	58	68
Yuma	55	59	64	70	77	85	91	90	85	73	62	55	72

TABLE 2: MEAN DAILY MAXIMUM TEMPERATURE (°F)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Alexandria	66	67	71	75	80	83	86	87	86	83	77	69	78
Aswan	77	79	88	97	103	108	107	106	103	99	88	78	94
Bilma	78	84	94	103	109	110	108	104	106	102	91	82	98
Cairo	67	70	76	83	90	95	96	95	90	86	79	70	83
El Azizia	63	70	76	84	92	98	104	105	102	90	76	65	86
Khartoum	86	89	96	103	107	107	102	99	102	102	94	88	98
Port Sudan	81	81	84	89	95	102	106	105	100	93	88	83	92
Quseir	73	73	77	82	88	92	93	94	91	87	82	76	84
Siwa	67	71	77	85	93	100	100	100	95	90	80	70	86
Tripoli	60	62	66	71	75	81	85	86	85	80	72	64	74
Yuma	67	72	78	86	93	102	106	104	100	88	76	68	87

TABLE 3: MEAN DAILY MINIMUM TEMPERATURE (°F)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Alexandria	51	51	54	58	63	69	73	74	72	68	62	54	62
Aswan	49	51	57	65	73	77	78	78	74	69	61	52	65
Bilma	43	46	54	61	70	72	73	74	70	60	52	47	60
Cairo	45	47	51	56	62	68	70	71	68	63	57	49	59
El Azizia	42	42	48	54	60	65	69	68	68	62	54	46	57
Khartoum	59	61	65	72	77	79	77	76	77	76	68	61	71
Port Sudan	68	66	67	70	75	78	83	84	79	76	74	70	74
Quseir	57	58	62	67	74	78	79	81	78	74	68	61	70
Siwa	39	41	46	53	60	67	69	68	65	58	50	42	55
Tripoli	47	49	53	57	62	68	72	73	71	67	59	51	61
Yuma	42	46	50	54	60	68	77	77	70	58	48	44	58

TABLE 4: ABSOLUTE MAXIMUM TEMPERATURE (°F)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Alexandria	81	91	103	108	108	111	102	105	106	104	96	85	111
Aswan	99	102	110	116	118	123	124	120	117	112	107	99	124
Bilma	95	97	108	113	117	118	117	114	113	109	107	95	118
Cairo	85	92	100	109	112	116	108	106	106	103	97	83	116
El Azizia	77	84	98	108	115	131	124	127	136	108	96	79	136
Khartoum	103	108	112	115	116	115	117	109	111	109	106	104	117
Port Sudan	88	89	94	101	111	117	118	116	113	107	96	93	118
Quseir	85	94	99	97	99	118	104	106	101	97	91	86	118
Siwa	86	95	99	108	114	117	115	115	111	106	98	86	117
Tripoli	79	90	95	104	104	109	109	106	109	102	95	79	109
Yuma	84	92	100	107	120	119	120	119	123	108	96	83	123

TABLE 5: ABSOLUTE MINIMUM TEMPERATURE (°F)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Alexandria	38	37	44	49	54	59	64	64	60	54	46	37	37
Aswan	37	35	43	49	52	66	68	67	63	54	37	36	35
Bilma	37	32	39	46	56	57	62	64	54	46	41	32	32
Cairo	31	37	37	46	50	58	62	65	58	54	45	36	31
El Azizia	32	32	32	39	45	53	52	53	52	44	34	31	31
Khartoum	41	44	49	53	61	67	66	64	61	62	54	45	41
Port Sudan	50	52	53	59	60	68	68	67	57	61	52	53	50
Quseir	39	46	52	58	63	70	72	69	71	66	58	51	39
Siwa	26	27	32	39	48	54	57	60	54	47	36	28	26
Tripoli	35	37	40	45	49	57	62	64	61	53	42	39	35
Yuma	22	25	31	38	39	50	61	58	50	38	29	22	22

TABLE 6: AVERAGE PRECIPITATION (INCHES)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Alexandria	2.01	.94	.43	.12	.04	T	T	T	.04	.20	1.30	2.32	7.40
Aswan	-	-	-	-	-	-	-	-	-	-	-	-	-
Bilma	0	0	0	.01	T	0	.08	.49	.27	0	0	0	.85
Cairo	.24	.16	.20	.08	.08	.04	0	0	T	.08	.08	.20	1.16
El Azizia	1.54	.94	.92	.27	.29	.02	.02	T	.08	.60	1.08	2.66	8.42
Khartoum	0	0	T	T	.12	.35	1.97	2.87	.71	.16	T	0	6.18
Port Sudan	.28	.16	.04	.04	.04	T	.24	.16	T	.55	1.77	1.02	4.30
Quseir	T	T	T	T	T	0	0	0	T	T	.16	.12	.28
Siwa	.08	T	.04	.04	T	T	0	0	0	T	.04	.12	.32
Tripoli	3.20	1.78	1.04	.39	.23	.05	.02	.03	.37	1.51	2.53	3.76	14.91
Yuma	.39	.41	.32	.09	.03	.01	.19	.57	.40	.27	.23	.47	3.38

TABLE 7: MEAN DEW POINT (°F)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Alexandria[1]	47	48	50	55	60	66	70	70	67	63	57	65	59
Aswan[1]	38	37	40	45	53	55	56	55	53	52	48	41	48
Bilma[2]	40	41	43	48	56	58	63	67	61	55	50	43	55
Cairo[1]	45	44	48	51	55	60	64	66	65	61	56	48	56
El Azizia	-	-	-	-	-	-	-	-	-	-	-	-	-
Khartoum[3] (Stack Lab)	40	35	31	36	43	53	61	66	62	53	46	43	47
Port Sudan[1]	64	63	65	68	69	68	71	71	71	74	71	66	64
Quseir[1]	49	47	55	55	61	65	67	68	66	64	59	52	60
Siwa[1]	43	41	47	51	56	61	62	65	61	60	53	47	55
Tripoli[4]	43	45	48	52	57	63	66	67	65	60	52	44	55
Yuma[3]	32	33	35	37	42	47	59	64	57	47	36	34	44

1 Based on observations at 0800, 1400, and 2000 hours, Egyptian Standard Time.
2 Based on observations made at 0800 and 1800 hours, Greenwich Mean Time.
3 Based on hourly observations (first order weather station).
4 Based on observations made at 0900, 1500, and 2100, zone time.

TABLE 8: AVERAGE CLOUDINESS (TENTHS OF SKY COVERED)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Alexandria	5.1	4.6	3.9	3.3	2.8	1.6	1.6	1.9	2.2	2.8	4.0	5.0	3.2
Aswan	1.3	1.2	1.0	1.0	0.9	0.2	0.2	0.2	0.2	0.3	0.7	1.0	0.7
Bilma	2.0	1.3	1.4	1.3	1.2	1.2	2.5	3.0	1.3	0.6	1.3	1.8	1.6
Cairo	4.1	3.5	2.6	2.1	1.8	0.7	1.1	1.2	1.3	1.8	2.8	3.7	2.2
El Azizia	4.4	3.3	4.3	2.9	3.4	4.0	1.0	1.7	2.2	3.7	4.1	4.8	3.3
Khartoum (Stack Lab)	1.1	1.2	1.2	1.4	2.5	2.7	4.2	4.0	3.2	1.8	0.7	0.7	2.0
Port Sudan	3.6	3.0	2.0	1.4	1.6	1.4	2.3	2.2	1.4	1.7	3.0	3.4	2.2
Quseir	1.7	1.4	0.7	0.8	0.8	0.8	0.0	0.0	0.0	0.3	0.5	0.4	0.6
Siwa	2.1	1.7	0.9	1.0	1.2	0.4	0.1	0.1	0.4	0.8	1.8	2.8	1.1
Tripoli	4.0	3.4	2.8	2.8	2.7	1.3	0.6	0.7	1.3	2.6	3.2	4.1	2.5
Yuma	2.3	2.4	2.1	1.5	1.1	0.6	1.6	1.8	1.1	1.2	1.6	2.4	1.6

TABLE 9: PREVAILING WIND DIRECTION AND AVERAGE SPEED (MPH)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Alexandria	W9	NW10	N9	NW9	NE8	NW9	NW10	NW9	N8	N7	NE7	SW8
Aswan	N4	N3	N4	N4	N4	N4	N3	N3	N3	N3	N3	N3
Bilma	NE5	NE5	NE4	E3	E3	E4	E3	W2	E2	E2	E3	NE2
Cairo	S4	S5	N6	N6	N6	N6	N4	N4	N4	N4	N4	S4
El Azizia	N-	SW-	N-	NE-	NE-	NE-	NE-	NE-	N-	N-	N-	N-
Khartoum	N5	N4	N4	N4	N4	SW5	SW5	SW4	SW3	N2	N3	N4
Port Sudan	N8	N8	N8	N6	N5	N5	E6	E5	N4	N4	N6	N7
Quesir	NW12	N12	N14	N13	N13	N12	N10	N10	N12	N10	NW10	NW10
Siwa	W1	W2	W1	W1	E1	N1	N1	NW1	NW1	W1	W1	W1
Tripoli	SW7	NW6	NE6	NE8	NE7	NE6	NE5	NE6	NE6	NE6	SW5	SW7
Yuma	N6	N6	W7	W7	W6	SW6	SW6	S6	SW5	N5	N5	N5

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Northwest Africa

STATIONS FOR TABLES OF MONTHLY VALUES

Station and Country	Elevation (Feet)	Latitude	Longitude	Length of Record (Yrs)
Algiers	126	36° 48' N	3° 02' E	20 - 36
Biskra	407	34° 54' N	5° 44' E	18
Ghardaia	1,739	32° 29' N	3° 38' E	14
El Golea	1,247	30° 33' N	3° 07' E	18 - 19
In Salah	919	27° 08' N	2° 27' E	14
Ouallen	1,135	24° 36' N	1° 14' E	15
Ft. Laperrine	4,480	22° 47' N	5° 31' E	7 - 15
Kidal	1,371	18° 26' N	1° 21' E	5 - 10
Niamey	715	13° 31' N	2° 06' E	9 - 29
Daker	131	14° 40' N	17° 26' W	22 - 25
Sidi Ifni	154	29° 25' N	10° 18' W	7
Gabes	6	33° 53' N	10° 07' E	50
Yuma	206	32° 40' N	114° 36' W	75

TABLE 1: MEAN MONTHLY TEMPERATURE (F°)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Algiers	54	56	59	62	66	72	77	79	76	70	63	58	66
Biskra	52	55	61	67	75	84	81	90	82	71	60	53	70
Ghardaia	51	55	61	69	76	87	94	92	85	72	61	53	71
El Golea	50	55	62	70	77	88	93	92	85	73	60	52	71
In Salah	56	61	68	77	84	95	98	97	91	80	66	58	78
Ouallen	62	67	74	82	88	98	100	99	94	84	71	63	82
Ft. Laperrine	53	56	63	71	78	83	83	82	79	72	64	57	90
Kidal	66	72	78	88	93	95	91	87	88	84	76	70	82
Niamey	75	80	86	93	93	89	85	82	85	87	83	77	85
Daker	71	72	72	73	76	81	83	82	83	83	79	74	77
Sidi Ifni	58	60	62	65	65	67	69	69	69	69	67	60	65
Gabes	52	54	60	64	70	75	80	82	78	71	62	54	67
Yuma	55	59	64	70	77	85	91	90	85	73	62	55	72

TABLE 2: MEAN DAILY MAXIMUM TEMPERATURE (°F)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Algiers	62	63	66	69	73	80	85	86	83	77	70	64	73
Biskra	61	66	72	79	87	97	104	103	94	82	69	62	81
Ghardaia	62	65	74	83	90	102	109	107	99	85	72	63	84
El Golea	64	68	75	84	90	102	112	105	99	87	73	64	85
In Salah	69	75	83	92	99	110	113	111	105	94	80	71	92
Ouallen	74	80	88	95	101	111	113	110	106	96	84	76	94
Ft. Laperrine	67	71	78	86	92	95	95	94	91	85	78	70	83
Kidal	80	88	95	105	109	110	107	102	104	100	92	86	98
Niamey	92	97	103	108	106	101	95	91	96	103	102	95	99
Daker	79	80	80	81	84	88	89	87	89	89	85	81	84
Sidi Ifni	65	67	69	72	70	72	74	74	75	76	74	67	71
Gabes	61	64	69	74	79	83	89	91	87	81	72	63	76
Yuma	67	72	78	86	93	102	106	104	100	88	76	68	87

TABLE 3: MEAN DAILY MINIMUM TEMPERATURE (°F)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Algiers	49	50	52	55	59	65	70	71	69	64	57	52	59
Biskra	42	45	50	55	63	71	77	76	70	61	50	45	59
Ghardaia	40	44	48	55	61	73	78	76	70	59	49	42	58
El Golea	37	42	49	56	64	74	79	78	71	60	47	40	58
In Salah	43	46	53	62	69	80	83	82	77	66	53	45	63
Ouallen	50	53	60	67	74	84	87	87	82	71	58	51	69
Ft. Laperrine	39	42	48	56	63	70	71	70	66	59	50	43	56
Kidal	51	56	61	70	78	79	75	73	73	69	61	55	67
Niamey	59	64	69	78	80	77	75	74	75	72	64	58	70
Daker	64	64	64	65	68	74	76	76	77	77	73	67	70
Sidi Ifni	51	53	56	59	60	63	64	64	64	63	60	54	60
Gabes	43	44	49	54	61	66	71	72	69	62	52	45	57
Yuma	42	46	50	54	60	68	77	77	70	58	48	44	58

TABLE 4: ABSOLUTE MAXIMUM TEMPERATURE (°F)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Algiers	82	87	88	96	103	109	112	112	110	97	92	84	112
Biskra	78	85	93	100	104	117	119	121	110	101	86	80	121
Ghardaia	81	88	96	104	109	124	126	124	117	106	91	82	126
El Golea	87	95	101	110	113	119	122	124	117	100	96	84	124
In Salah	88	95	104	114	130	126	133	128	121	111	107	91	133
Ouallen	-	-	-	-	-	-	-	-	-	-	-	-	-
Ft. Laperrine	83	88	91	96	102	110	107	104	100	95	86	82	110
Kidal	97	102	110	116	122	122	120	114	111	109	104	97	122
Niamey	105	108	116	117	116	114	106	103	105	108	108	107	117
Daker	102	100	109	100	105	100	100	100	100	101	99	95	109
Sidi Ifni	81	86	101	103	100	89	115	95	100	103	99	70	115
Gabes	81	88	99	108	109	115	122	117	120	111	97	81	122
Yuma	84	92	100	107	120	119	120	119	123	108	96	83	123

TABLE 5: MEAN DAILY MINIMUM TEMPERATURE (°F)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Algiers	28	33	34	40	44	52	61	62	49	43	40	34	28
Biskra	30	32	34	46	45	47	56	59	54	40	34	29	29
Gjardaia	22	23	27	36	45	54	52	57	51	39	32	23	22
El Golea	22	23	27	36	45	54	52	57	51	39	32	23	22
In Salah	26	20	34	39	49	55	63	59	54	40	28	25	25
Ouallen	-	-	-	-	-	-	-	-	-	-	-	-	-
Ft. Laperrine	20	25	32	38	40	54	58	58	56	47	31	27	20
Kidal	38	33	36	45	63	67	62	53	60	57	49	43	33
Niamey	46	49	56	63	64	65	62	66	67	58	54	48	46
Daker	55	55	56	59	62	66	67	67	67	67	65	53	53
Sidi Ifni	43	46	48	49	55	58	60	61	59	54	47	42	42
Gabes	27	28	36	39	39	50	48	57	54	43	34	32	27
Yuma	22	25	31	38	39	50	61	58	50	30	29	22	22

TABLE 6: AVERAGE PRECIPITATION (Inches)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Algiers	4.07	2.79	3.28	2.13	1.46	.48	.12	.12	1.23	3.18	3.85	4.51	27.22
Biskra	.57	.37	.69	.56	.42	.22	.05	.021	.51	.63	.69	.87	5.79
Ghardaia	.35	.12	.28	.16	.20	.16	.04	.08	.20	.28	.51	.28	2.66
El Golea	.18	.23	.12	.04	.03	.02	0	.02	.04	.32	.25	.26	1.52
In Salah	.14	.12	.02	.01	.01	0	0	.05	.02	.03	.19	.07	.66
Ouallen	.01	.02	.07	0	0	0	.04	.14	.02	T	.16	0	.46
Ft. Laperrine	.24	.02	.04	.16	.43	.14	.12	.40	.10	.04	.01	.04	1.74
Kidal	0	.04	0	.04	.19	.23	1.01	2.49	1.06	.05	0	.01	5.12
Niamey	.05	T	.13	.37	1.35	3.11	4.69	9.36	2.98	.75	.03	0	22.82
Daker	.03	.04	.02	T	.04	.72	3.43	9.71	4.96	1.38	.12	.22	20.67
Sidi Ifni	1.00	.67	.53	.34	.19	.22	.04	.02	.57	.22	1.08	1.20	6.06
Gabes	.86	.67	.83	.39	.35	.04	.01	.08	.55	1.18	1.34	.59	6.89
Yuma	.39	.41	.32	.09	.03	.01	.19	.57	.40	.27	.23	.47	3.38

TABLE 7: MEAN DEW POINT (°F)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Algiers	45	46	47	50	55	61	66	70	64	57	51	46	56
Biskra	39	39	40	43	49	54	58	61	60	54	46	41	50
Ghardaia	41	43	47	49	53	59	66	66	59	51	46	42	53
El Golea	35	32	36	38	44	48	54	55	51	48	40	35	44
In Salah	35	38	43	46	49	59	54	53	55	50	45	37	48
Ouallen	17	21	.20	28	24	29	32	45	41	44	35	30	31
Ft. Laperrine	31	20	28	33	41	38	38	41	41	37	34	25	34
Kidal	-	-	-	-	-	-	-	-	-	-	-	-	-
Niamey	38	40	50	59	72	71	71	73	74	69	56	46	62
Daker	56	58	61	62	65	71	73	74	75	73	67	59	67
Sidi Ifni	51	53	55	58	59	62	65	65	65	63	61	54	59
Gabes	41	42	47	54	60	65	69	71	67	62	50	43	56
Yuma	32	33	35	37	42	47	59	64	57	47	36	34	44

TABLE 8: AVERAGE CLOUDINESS (10ths of Sky Covered)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Algiers	5.0	4.9	4.9	4.6	4.3	3.1	2.8	2.6	3.9	4.5	5.2	5.2	4.2
Biskra	2.7	3.0	3.1	2.7	3.0	2.4	1.4	1.8	2.9	2.7	2.9	3.2	2.7
Ghardaia	2.2	2.5	2.5	2.2	2.1	1.7	1.4	1.4	2.2	2.4	2.7	2.3	2.2
El Golea	1.9	2.0	2.4	1.8	2.0	1.5	1.0	1.2	2.0	2.3	2.8	2.1	1.9
In Salah	1.6	1.7	1.7	1.9	2.2	1.6	0.9	1.2	1.6	2.2	2.7	2.1	1.8
Ouallen	1.5	1.2	1.7	1.6	1.4	1.6	1.5	2.1	1.7	2.3	2.9	2.1	1.8
Ft. Laperrine	2.5	2.0	1.6	2.8	3.0	3.2	3.1	3.1	3.1	2.5	2.8	2.9	2.7
Kidal	1.0	0.8	0.6	0.8	1.4	2.1	2.7	3.0	2.7	1.6	1.4	1.5	1.4
Niamey	1.6	1.5	1.8	3.8	3.2	3.4	4.1	5.1	3.8	2.6	1.5	1.4	2.7
Daker	4.4	4.0	3.4	3.2	3.7	4.7	5.7	6.8	6.0	4.7	5.1	5.1	4.7
Sidi Ifni	4.2	4.2	4.8	4.9	6.3	7.0	7.2	6.5	5.6	3.1	5.3	3.9	5.4
Gabes	-	-	-	-	-	-	-	-	-	-	-	-	-
Yuma	2.3	2.4	2.1	1.5	1.1	0.6	1.6	1.0	1.1	1.2	1.6	2.4	1.6

TABLE 9: PREVAILING WIND DIRECTION* AND AVERAGE VELOCITY (MPH)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Algiers	W	W	W	E-W	E	N	N	E	E	W	W	W
Biskra	NW	NW	NW	NW	NW	SE	SE	SE	NW	NW	NW	NW
Ghardaia	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
El Golea	C	C	C	C	C	C	C	C	C	C	C	C
In Salah	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Ouallen	C	C	C	C	C	C	C	C	C	C	C	C
Ft. Laperrine	NE	NW	NW	NW	NW	E	E	E	NE	NE	NE	NE
Kidal	E2	E2	E5	NE4	NE4	E5	W5	W2	SWE2	E2	E2	NE3
Niamey	E10	E8	E10	11**	WSW14	WSW12	SW12	SW9	SSW9	W6	E6	E9
Daker	N14	N16	N17	N18	N15	W12	W11	WNW10	NW11	N11	N13	N14
Sidi Ifni	NNE6	NNE6	NNE6	NNE6	NNW5	SW5	SW5	NNW5	NNW5	NNE5	NNE6	NNE3
Gabes	C	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
Yuma	N6	N6	W7	W7	W6	SW6	SW6	S6	SW5	N5	N5	N6

*C = Calm
**Direction Variable

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South Central Asia

TABLE 3: MEAN MONTHLY TEMPERATURE (°F)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr
Jodhpur	64	67	77	86	93	93	89	85	85	82	74	66	80
Karachi	67	69	75	80	84	86	85	83	82	81	76	70	78
Jacobabad	58	63	75	85	95	99	97	93	90	81	70	60	81
D.I. Khan	55	58	68	79	89	95	93	91	87	78	65	56	76
Peshawar	51	54	63	73	84	92	92	89	83	73	61	53	72
Gilgit	39	44	53	62	72	80	84	83	75	64	52	42	63
Kabul	31	33	45	56	66	72	76	75	68	58	49	38	56
Seistan	46	51	60	71	80	88	91	88	80	69	57	48	69
Isfahan	36	41	49	59	68	78	82	80	73	62	50	40	60
Tehran	36	41	49	60	70	80	85	84	77	64	53	42	62
Bushire	57	59	66	74	83	87	89	91	87	80	71	61	75
Yuma	55	59	64	70	77	85	91	90	85	73	62	55	72

TABLE 4: MEAN DAILY MAXIMUM TEMPERATURE (°F)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr
Jodhpur	77	81	91	100	106	104	98	93	95	96	89	80	92
Karachi	76	77	82	85	89	90	89	86	86	87	85	79	84
Jacobabad	73	78	91	100	112	114	109	105	104	99	87	76	97
D.I. Khan	69	72	82	93	104	108	103	101	100	94	82	72	90
Peshawar	63	66	75	85	99	107	104	100	96	88	77	67	86
Gilgit	46	52	62	72	84	93	97	95	87	75	63	50	73
Kabul	43	45	56	70	80	88	92	92	86	75	65	50	70
Seistan	58	63	73	84	93	100	103	100	93	84	72	60	82
Isfahan	47	53	61	71	82	93	98	96	90	77	64	51	74
Tehran	44	50	59	71	82	93	99	97	90	76	63	50	73
Bushire	64	65	73	81	89	92	95	97	94	88	78	68	82
Yuma	67	72	78	86	93	102	106	104	100	88	76	68	87

TABLE 5: MEAN DAILY MINIMUM TEMPERATURE (°F)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr
Jodhpur	64	67	77	86	93	93	89	85	85	82	74	66	80
Karachi	67	61	68	74	79	82	81	79	77	74	67	60	72
Jacobabad	44	49	60	70	79	85	85	82	76	64	52	44	66
D.I. Khan	40	45	55	65	75	82	83	81	75	62	48	41	63
Peshawar	51	54	63	73	84	92	92	89	83	73	61	53	72
Gilgit	32	37	45	53	60	67	72	71	64	53	42	34	52
Kabul	18	21	34	43	51	56	60	59	51	41	33	25	41
Seistan	34	38	47	58	67	75	79	76	66	54	42	35	56
Isfahan	24	29	37	46	54	63	67	64	57	47	37	28	46
Tehran	27	32	39	49	85	66	72	71	66	53	43	33	51
Bushire	51	53	59	67	76	81	84	84	79	72	63	55	69
Yuma	42	46	50	54	60	68	77	77	70	58	48	44	58

TABLE 6: ABSOLUTE MAXIMUM TEMPERATURE (°F)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr
Jodhpur	91	100	106	115	116	115	110	105	108	107	98	90	116
Karachi	89	93	106	111	118	114	110	99	106	108	100	91	118
Jacobabad	89	102	112	119	126	127	126	118	115	112	103	90	127
D.I. Khan	83	89	106	114	120	122	120	114	110	106	93	85	122
Peshawar	77	86	98	108	118	120	122	118	110	101	89	81	122
Gilgit	57	74	82	93	106	110	113	108	104	92	77	64	113
Kabul	75	77	87	99	102	109	112	107	102	98	92	82	112
Seistan	78	89	94	99	109	112	112	113	107	101	87	79	113
Isfahan	69	71	80	89	96	104	107	106	100	90	79	68	107
Tehran	64	73	84	92	99	107	109	109	101	90	79	67	109
Bushire	80	85	105	103	107	112	112	115	107	101	93	87	115
Yuma	84	92	100	107	120	119	120	119	123	108	96	83	123

TABLE 7: ABSOLUTE MINIMUM TEMPERATURE (°F)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr
Jodhpur	30	33	49	59	66	72	68	70	68	57	42	38	30
Karachi	40	43	47	57	65	68	73	73	69	57	48	39	39
Jacobabad	25	29	39	48	61	70	72	68	60	47	33	31	25
D.I. Khan	28	27	36	44	58	60	66	69	61	46	28	26	26
Peshawar	28	28	33	40	51	63	66	66	58	44	25	26	25
Gilgit	17	22	27	38	43	50	56	54	48	38	28	22	17
Kabul	-7	-5	9	20	31	31	45	45	34	20	5	0	-7
Seistan	17	23	28	43	51	61	65	68	52	36	23	18	17
Isfahan	-4	8	6	26	37	48	48	52	46	28	20	10	-4
Tehran	-4	4	10	23	28	50	58	57	50	38	23	10	-4
Bushire	32	37	42	47	58	67	74	69	63	55	42	37	32
Yuma	22	25	31	38	39	50	61	58	50	38	29	22	22

TABLE 8: AVERAGE PRECIPITATION (Inches)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr
Jodhpur	0.15	0.24	0.11	0.13	0.41	1.42	3.97	4.84	2.40	0.32	0.11	0.11	14.21
Karachi	0.46	0.44	0.29	0.15	0.06	0.72	3.20	1.56	0.52	0.02	0.08	0.20	7.70
Jacobabad	0.25	0.30	0.24	0.18	0.14	0.22	1.05	1.13	0.23	0.02	0.05	0.14	3.95
D.I. Khan	0.45	0.67	0.96	0.69	0.39	0.61	2.29	1.90	0.63	0.11	0.15	0.24	9.09
Peshawar	1.44	1.53	2.44	1.76	0.77	0.31	1.26	2.03	0.81	0.23	0.31	0.67	13.56
Gilgit	0.25	0.26	0.80	0.96	0.90	0.37	0.39	0.55	0.40	0.24	0.05	0.11	5.18
Kabul	1.72	1.80	3.25	2.59	0.97	0.21	0.11	0.12	0.05	0.35	0.50	0.95	12.62
Seistan	0.39	0.44	0.55	0.13	0.02	0.00	0.00	0.00	0.00	0.07	0.10	0.41	2.11
Isfahan	0.65	0.45	0.93	0.61	0.20	0.02	0.02	0.01	0.03	0.14	0.56	0.87	4.49
Tehran	1.65	1.14	1.96	1.37	0.60	0.08	0.16	0.04	0.08	0.34	0.88	1.23	9.53
Bushire	2.67	1.88	0.95	0.49	0.02	0.00	0.00	0.00	0.00	0.08	1.36	2.94	10.39
Yuma	0.39	0.41	0.32	0.09	0.03	0.01	0.19	0.57	0.40	0.27	0.23	0.47	3.38

TABLE 9: MEAN DEW POINT, 0600 (°F)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr
Jodhpur	34	28	39	46	59	70	73	73	70	54	38	36	52
Karachi	46	54	62	71	76	79	78	76	74	69	61	55	67
Jacobabad	38	42	50	58	68	76	78	75	73	59	49	44	59
D.I. Khan	34	37	49	57	62	70	76	76	70	56	42	40	56
Peshawar	32	39	46	53	54	59	70	73	66	49	40	38	52
Gilgit	26	26	31	42	49	54	59	63	54	41	30	27	42
Kabul	18	22	32	40	44	42	46	47	37	32	25	23	34
Seistan	41	38	43	52	56	56	56	57	50	44	38	36	47
Isfahan	21	38	29	37	47	46	46	47	38	31	39	25	37
Tehran	37	27	30	38	51	52	57	45	37	22	--	38	--
Bushire	47	50	53	58	67	73	77	76	71	65	58	52	62
Yuma*	32	33	35	37	42	47	59	64	57	47	36	34	44

* Mean of daily observations at 0600, 1200, and 1800

TABLE 10: AVERAGE CLOUDINESS (10ths of Sky Covered)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr
Jodhpur*	2.9	2.7	2.0	2.1	1.2	3.3	7.6	7.7	4.1	1.3	1.5	2.4	3.2
Karachi*	2.6	2.3	2.4	2.6	3.3	5.4	7.3	7.5	4.8	1.6	1.1	1.9	3.6
Jacobabad**	2.3	1.8	1.7	1.3	0.5	1.7	1.8	1.1	0.5	0.3	0.8	1.7	1.3
D.I. Khan*	3.2	3.2	3.4	2.6	1.1	1.2	2.3	2.2	1.0	0.5	1.3	2.7	2.1
Peshawar**	4.3	4.1	4.1	3.2	2.1	1.9	2.4	2.5	1.2	1.2	2.2	3.2	2.6
Gilgit*	7.4	6.9	6.6	5.9	4.6	3.1	3.6	3.7	3.4	3.4	3.7	6.2	4.9
Kabul*	4.2	4.9	4.5	4.2	3.0	1.5	1.5	1.5	0.9	1.4	2.6	4.0	2.8
Seistan**	4.0	3.6	3.4	2.4	1.6	0.7	0.8	0.5	0.5	0.8	2.3	2.9	2.0
Isfahan**	3.6	3.2	4.2	3.4	3.2	0.8	1.6	1.4	1.0	1.8	3.6	4.2	2.7
Tehran**	4.1	4.5	3.8	4.2	2.9	0.8	1.4	1.1	0.6	1.8	3.7	4.3	2.8
Bushire*	4.5	4.0	4.1	3.3	2.2	0.2	0.8	1.0	0.6	1.0	2.6	4.7	2.4
Yuma**	2.3	2.4	2.1	1.5	1.1	0.6	1.6	1.8	1.1	1.2	1.6	2.4	1.6

* Morning reading only

** Mean of two or more daily readings

TABLE 11: AVERAGE WIND SPEED (MPH)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Jodhpur	3	3	3	4	7	6	6	5	3	2	2	3
Karachi	6	7	8	10	11	13	13	12	10	6	5	6
Jacobabad	2	2	3	3	3	4	4	3	2	2	1	1
D.I. Khan	1	1	2	2	2	2	2	2	1	1	1	1
Peshawar	2	3	4	4	5	4	4	4	3	2	2	2
Gilgit	1	1	1	1	1	*	*	*	*	*	*	*
Kabul	3	3	2	2	2	2	2	2	2	2	2	2
Seistan	4	5	6	8	10	12	14	14	12	7	5	4
Isfahan	2	3	4	4	3	2	2	2	2	2	1	1
Tehran	1	2	2	2	2	2	1	1	1	1	1	1
Bushire	5	5	6	5	5	7	5	4	3	3	4	4
Yuma	6	6	7	7	6	6	6	6	5	5	5	5

* Less than 0.6

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Soviet Middle Asia

TABLE 2: STATIONS USED IN TABLES OF MONTHLY VALUES

Station	Elevation	Latitude	Longitude	Length of Record (yrs)
Akmolinsk	1,148	51°10'N	71°30'E	16-32
Baku	-43	40°21'N	49°51'E	18-57
Bayram Ali	791	37°37'N	62°08'E	18-36
Fort Shevchenko	-79	44°31'N	50°16'E	15-42
Kizl-Arvat	407	38°58'N	56°15'E	5-25
Tashkent	1,568	41°20'N	69°18'E	17-56
Termes	1,017	37°12'N	67°15'E	7-19
Turtkul	341	41°28'N	61°07'E	28-52
Uralsk	124	51°12'N	51°22'E	17-25
Yuma, Arizona	206	32°40'N	114°36'W	70-79

TABLE 3: MEAN MONTHLY TEMPERATURE* (°F)

Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr
Akmolinsk	0	4	12	33	56	66	70	65	53	36	19	8	35
Baku	38	39	44	51	63	72	77	78	71	62	51	44	57
Bayram Ali	38	40	49	62	73	81	86	82	70	58	48	36	60
Ft. Shevchenko	25	28	37	50	65	74	79	78	66	54	41	32	52
Kizl-Arvat	31	38	48	61	74	84	90	85	73	60	47	38	61
Tashkent	32	33	46	59	69	78	81	78	67	54	44	36	57
Termez	37	42	51	65	77	86	90	86	75	61	53	42	64
Turtkul	22	30	42	58	72	80	84	79	68	52	38	29	55
Uralsk	4	10	18	39	59	68	74	69	56	42	23	11	39
YUMA, Arizona	55	59	64	70	77	85	91	90	85	73	62	55	72

*Tri-daily means, except for Yuma

TABLE 4: MEAN DAILY MAXIMUM TEMPERATURES* (°F)

Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr
Akmolinsk	4	9	20	40	64	73	78	74	62	43	23	11	42
Baku	40	42	46	54	67	76	82	82	74	66	53	46	61
Bayram-Ali	39	49	59	72	86	94	98	95	86	72	59	50	71
Ft. Shevchehkp	27	33	42	55	69	80	85	84	72	59	44	34	57
Kizyl-Arvat	26	49	57	75	84	94	101	100	89	76	56	42	71
Tashkent	36	44	53	66	78	87	92	89	81	66	53	45	66
Termez	44	51	59	75	87	97	102	98	88	74	64	53	74
Turtkul	28	38	50	67	88	91	95	92	81	66	48	37	65
Uralsk	6	13	23	44	66	76	81	78	64	48	27	12	45
YUMA	67	72	78	86	93	102	106	104	100	88	76	68	87

*In most cases, mean 1300 temperatures.

TABLE 5: MEAN DAILY MINIMUM TEMPERATURES (°F)

Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr
Akmolinsk	-8	7	1	23	42	51	55	52	41	27	11	-2	24
Baku	34	36	39	46	56	66	72	72	66	58	46	40	52
Bayram-Ali	23	29	37	48	58	65	67	64	53	43	36	29	46
Ft. Shevchenko	22	25	34	42	56	66	70	67	57	45	35	28	46
Kizl-Arvat	24	30	40	49	62	70	74	71	61	49	38	32	50
Tashkent	23	28	37	47	56	62	65	61	52	42	35	48	44
Termez	--	--	--	--	--	--	--	--	--	--	--	--	--
Turtkul	--	--	--	--	--	--	--	--	--	--	--	--	--
Uralsk	-4	1	11	30	46	55	59	55	45	33	17	3	29
YUMA	42	46	50	54	60	68	77	77	70	58	48	44	58

TABLE 6: ABSOLUTE MAXIMUM TEMPERATURE (°F)

Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr
Akmolinsk	42	48	50	84	90	96	99	98	90	78	59	38	99
Baku	65	71	75	80	92	95	99	99	91	82	80	70	99
Bayram Ali	73	83	92	101	109	113	113	112	106	100	94	84	113
Ft. Shevchenko	51	59	69	80	94	99	106	107	93	85	68	63	107
Kizyl-Arvat	71	87	95	97	105	113	113	109	110	99	85	77	113
Tashkent	67	76	98	94	104	108	109	108	100	94	86	76	109
Termez	73	79	86	95	107	122	115	113	106	100	89	79	122
Turtkul	62	73	91	95	110	108	112	109	103	92	79	66	112
Uralsk	36	35	60	79	92	101	104	98	96	81	56	39	104
YUMA	84	92	100	107	120	119	120	119	123	108	96	83	123

TABLE 7: ABSOLUTE MINIMUM TEMPERATURE (°F)

Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr
Akmolinsk	-44	-56	-34	-15	19	31	38	34	18	-16	-34	-50	-56
Baku	8	19	23	32	44	47	57	57	45	39	27	18	8
Bayram Ali	-14	-6	2	27	40	50	56	50	29	17	1	5	-14
Ft. Shevchenko	-7	-2	4	23	36	42	57	55	38	27	15	5	-7
Kizyl-Arvat	-15	-14	16	27	43	54	56	54	39	28	4	-4	-15
Tashkent	-19	-14	-3	22	33	43	48	46	33	11	-7	-13	-19
Termez	—	—	—	—	—	—	—	—	—	—	—	—	—
Turtkul	—	—	—	—	—	—	—	—	—	—	—	—	—
Uralsk	-42	-30	-24	-10	23	32	41	32	20	6	-31	-39	-42
YUMA	22	25	31	38	39	50	61	58	50	38	29	22	22

TABLE 8: AVERAGE PRECIPITATION (Inches)

Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr
Akmolinsk	.59	.51	.51	.55	.98	1.81	1.38	1.50	1.06	1.06	.67	.59	11.20
Baku	.75	.55	.71	.75	.39	.23	.16	.20	.63	.94	1.14	.90	7.36
Bayram Ali	.63	.55	1.38	.75	.23	.08	.00	.00	.04	.24	.39	.47	4.80
Ft. Shevchenko	.32	.24	.35	.51	.67	.51	.43	.59	.64	.47	.39	.51	5.63
Kizyl-Arvat	1.10	.83	1.38	.87	.63	.32	.20	.39	.20	.59	.79	.79	8.07
Tashkent	1.77	1.46	2.48	2.00	1.14	.47	.12	.04	.20	1.02	1.34	1.65	13.70
Termez	.71	.59	1.14	.71	.47	.00	.00	.00	.00	.20	.32	.16	4.30
Turtkul	.39	.35	.71	.55	.25	.16	.04	.04	.04	.16	.24	.31	3.23
Uralsk	.88	.79	.64	.76	1.26	1.18	.98	1.02	.91	1.03	1.22	1.10	11.77
YUMA	.39	.41	.32	.09	.03	.01	.19	.57	.40	.27	.23	.47	3.38

TABLE 9: MEAN DEW POINT (°F)

Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Akmolinsk*	-3	0	9	29	45	53	55	52	43	30	17	5
Baku	32	34	38	45	55	60	66	66	61	54	45	37
Bayram Ali	29	30	39	45	49	50	51	48	42	34	26	30
Ft. Shevchenko	26	27	30	40	52	64	65	65	53	43	34	29
Kizyl-Arvat	28	31	37	43	49	51	55	52	46	39	38	33
Tashkent	25	27	35	45	52	56	57	54	46	39	33	29
Temez	--	--	--	--	--	--	--	--	--	--	--	--
Turtkul	21	24	32	40	47	51	66	52	44	34	27	25
Uralsk*	3	6	16	33	46	54	57	53	44	33	22	12
YUMA	32	33	35	37	42	47	59	64	57	47	36	34

*Derived from mean monthly temperatures and relative humidities.
(All other values bases on published records of absolute humidity)

TABLE 10: AVERAGE CLOUDINESS (10ths of sky covered)

Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr
Akmolinsk	7.1	5.8	5.7	5.0	5.1	5.1	4.9	4.9	5.3	5.9	7.1	7.6	5.8
Baku	6.7	6.6	6.7	6.0	4.6	2.6	3.0	2.3	3.5	5.1	6.6	6.8	5.0
Bayram Ali	5.4	4.8	5.2	4.9	3.9	1.7	0.8	0.4	0.6	2.2	3.9	4.9	3.2
Ft. Shevchenko	6.8	6.3	5.8	5.5	4.8	4.1	3.5	3.1	4.2	5.1	6.9	7.6	5.3
Kizyl-Arvat	6.5	5.7	5.1	5.0	4.2	2.5	2.3	1.8	1.6	2.9	5.1	6.1	4.1
Tashkent	6.4	6.0	5.8	5.5	3.9	2.4	1.7	0.9	1.6	3.5	5.0	6.1	4.1
Termez	4.8	4.9	4.5	3.9	3.0	1.0	0.5	0.3	0.5	1.7	3.2	4.3	2.7
Turtkul	5.5	4.8	4.6	4.3	3.5	2.2	1.5	0.9	1.3	2.3	3.7	5.7	3.3
Uralsk	6.7	5.7	6.5	5.1	4.6	5.0	4.4	4.3	5.0	6.4	7.1	7.2	5.6
YUMA	2.3	2.4	2.1	1.5	1.1	0.6	1.6	1.8	1.1	1.2	1.6	2.4	1.6

TABLE 11: AVERAGE WIND SPEED (mph)

Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Akmolinsk	12	12	13	12	10	10	9	9	8	10	12	11
Baku	12	13	13	13	12	13	14	15	13	12	12	11
Bayram Ali	4	3	4	3	3	2	3	3	2	2	3	3
Ft. Shevchenko	18	16	17	16	14	13	12	12	15	16	17	15
Kizyl-Arvat	8	7	9	8	7	7	6	7	7	7	8	7
Tashkent	4	5	5	5	4	4	4	3	3	4	4	4
Termez	3	3	4	4	4	3	4	5	3	3	2	2
Turtkul	6	6	6	6	6	5	5	4	4	4	4	5
Uralsk	14	12	15	15	15	13	12	12	14	14	14	15
YUMA	6	6	7	7	6	6	6	5	5	5	5	5

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Chinese Inner Asia

TABLE 2: STATIONS USED IN TABLES OF MONTHLY VALUES

Station	Elevation (feet)	Latitude	Longitude	Length of record (yrs)
Kashgar, Sinkiang	4,255	39°27' N	75°58' E	18-35
Lanchou, Kansu	5,105	36 03 N	103 41 E	4-49
Paotow, Suiyuan	3,361	40 36 N	110 03 E	2-3
Peking, Hopeh	139	39 54 N	116 28 E	7-86
Tulan, Chinghai	11,000	36 55 N	98 33 E	1-3
Tunhwang, Kansu	3,608	40 08 N	94 47 E	2-4
Turfan, Sinkiang	-49	43 00 N	89 18 E	1-5
Urga (Ulan Bator), Mongolia	3,773	47 55 N	106 50 E	4-26
Yuma, Arizona	206	32 40 N	114 36 W	70-80

TABLE 3: MEAN MONTHLY TEMPERATURE (°F)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr.
Kashgar	23	31	46	59	69	76	80	78	70	57	41	27	55
Lanchou	19	29	41	53	62	69	73	70	61	49	34	24	49
Paotow	5	18	29	46	59	68	70	70	59	48	27	4	42
Peking	24	29	41	56	68	75	79	77	68	55	39	27	52
Tulan	16	23	32	39	50	59	64	61	52	41	24	18	39
Tunhwang	21	30	42	54	67	73	81	76	65	53	36	25	52
Turfan	19	25	48	60	76	91	93	92	80	57	36	19	59
Urga	11	-3	12	33	46	58	63	60	47	31	8	6	28
YUMA	55	59	64	70	77	85	91	90	85	73	62	55	72

TABLE 4: MEAN DAILY MAXIMUM TEMPERATURE (°F)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr.
Kashgar	33	43	56	71	81	89	92	90	83	71	54	38	67
Lanchou	31	44	53	65	76	81	82	81	72	60	47	37	61
Paotow	18	31	42	59	73	79	81	81	71	63	40	17	55
Peking	34	40	52	68	80	88	89	87	80	69	50	37	65
Tulan	34	39	50	59	67	73	80	77	67	58	42	37	57
Tunhwang	34	44	55	68	82	87	96	90	80	69	48	36	66
Turfan	25	39	64	77	88	103	105	102	90	74	51	29	71
Urga	-2	9	25	44	54	69	71	69	59	44	22	4	39
YUMA	67	72	78	86	93	102	106	104	100	88	76	68	87

TABLE 5: MEAN DAILY MINIMUM TEMPERATURE (°F)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr.
Kashgar	12	19	35	48	58	64	68	66	57	43	29	17	43
Lanchou	8	16	29	40	50	57	62	61	52	39	23	12	37
Paotow	-8	4	15	33	43	56	60	59	46	33	14	-9	29
Peking	15	11	30	44	56	65	71	69	58	44	30	19	43
Tulan	0	8	16	29	36	41	48	44	36	26	12	4	25
Tunhwang	8	15	28	39	53	59	66	62	50	38	24	13	38
Turfan	2	12	37	51	60	76	76	70	58	42	23	9	43
Urga	-27	-23	-7	17	28	43	50	45	35	18	-3	-19	13
YUMA	42	46	50	54	60	68	77	77	70	58	48	44	58

TABLE 6: ABSOLUTE MAXIMUM TEMPERATURE (°F)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yrs Rec.
Kashgar	65	73	86	99	102	109	109	110	101	89	83	60	35
Lanchou	51	63	78	88	96	97	100	98	90	82	71	68	9
Paotow	32	50	60	76	92	98	92	93	89	73	55	35	2-3
Peking	54	63	80	96	99	107	104	100	94	87	76	55	60
Tulan	48	54	75	77	80	84	90	86	86	77	61	50	1-2
Tunhwang	50	64	74	92	101	103	111	103	95	87	72	54	3-4
Turfan	34	60	83	92	105	114	115	113	105	88	61	54	2
Urga	21	35	64	76	87	97	92	91	83	73	52	32	16
YUMA	84	92	100	107	120	119	120	119	123	108	96	83	80

TABLE 7: ABSOLUTE MINIMUM TEMPERATURE (°F)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yrs Rec.
Kashgar	-7	-8	15	29	38	43	50	49	40	27	13	-2	35
Lanchou	-3	4	13	20	33	37	51	[illegible]	40	25	4	0	8
Paotow	-21	-10	-8	13	34	39	49	[illegible]	32	16	-2	-27	2
Peking	-3	4	7	26	39	50	59	54	35	27	8	-3	55
Tulan	-7	-4	2	14	24	29	35	35	21	14	0	-4	3
Tunhwang	-9	-1	12	19	37	44	50	45	33	14	0	-4	2-3
Turfan	-11	1	16	38	32	62	64	59	45	25	12	-2	2-3
Urga	-47	-48	-39	-11	10	22	34	20	5	-16	-32	-45	16
YUMA	22	25	31	38	39	50	61	58	50	38	29	22	80

TABLE 8: AVERAGE PRECIPITATION (inches)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr.
Kashgar	0.6	0.1	0.5	0.2	0.3	0.2	0.4	0.3	0.1	0.1	0.2	0.3	3.2
Lanchou	*	0.1	0.2	0.4	1.1	1.3	2.5	3.9	1.9	0.5	0.1	0.1	12.1
Paotow	*	0.1	0.1	0.9	0.7	3.1	2.8	1.0	1.6	0.1	0.1	0.0	10.6
Peking	0.1	0.2	0.3	0.6	1.3	3.2	9.8	5.8	2.3	0.7	0.3	0.1	24.7
Tulan	*	0.1	0.3	0.4	0.2	0.5	0.3	1.2	1.0	0.1	0.1	*	4.2
Tunhwang	*	0.0	*	0.2	0.2	0.4	0.1	0.2	0.1	*	0.0	*	1.3
Turfan	0.0	0.0	0.0	0.0	0.6	0.1	*	0.1	0.0	0.0	0.0	0.0	0.8
Urga	*	*	0.1	0.2	0.3	1.0	2.9	1.9	0.8	0.2	0.2	0.1	7.7
YUMA	0.4	0.4	0.3	0.1	*	*	0.2	0.6	0.4	0.3	0.2	0.5	3.4

* < 0.05 inches

TABLE 9: MEAN DEW POINT (°F)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr.
Kashgar	—	—	—	—	—	—	—	—	—	—	—	—	—
Lanchou	9	15	21	29	40	48	54	58	50	38	23	14	37
Paotow	-2	8	10	26	32	50	57	60	44	28	13	-3	34
Peking	11	14	23	34	47	58	69	68	56	41	26	15	45
Tulan	14	18	27	33	34	41	46	48	35	22	4	-2	30
Tunhwang	16	20	27	31	40	47	53	53	44	33	23	18	36
Turfan	—	—	19	33	41	55	58	58	49	40	—	—	—
Urga*	-15	-8	5	20	31	44	53	49	36	21	2	-10	28
YUMA	32	33	35	37	42	47	59	64	57	47	36	34	46

*Derived from mean monthly temperatures and relative humidities
(all other values based on published records of absolute humidity)

TABLE 10: AVERAGE CLOUDINESS (10ths of sky covered)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr.
Kashgar	—	—	—	—	—	—	—	—	—	—	—	—	—
Lanchou	4.8	4.4	5.6	6.6	4.6	6.7	6.7	5.7	5.8	5.7	3.9	3.6	5.4
Paotow	—	—	—	—	—	—	—	—	—	—	—	—	—
Peking	2.0	2.4	3.3	3.9	4.0	4.6	5.4	4.7	3.8	2.4	2.3	1.8	3.4
Tulan	3.7	4.9	4.8	5.1	5.9	5.4	6.2	4.3	4.8	3.4	3.7	3.1	4.6
Tunhwang	4.5	5.4	6.0	5.8	5.9	5.3	6.1	4.8	3.7	2.8	3.0	4.9	4.9
Turfan	3.6	3.6	3.9	5.2	5.0	4.6	4.0	3.7	2.2	3.0	2.2	2.9	3.7
Urga	2.4	2.2	2.9	4.5	4.8	5.0	5.3	4.7	3.6	3.1	3.0	2.8	3.7
YUMA	2.3	2.4	2.1	1.5	1.1	0.6	1.6	1.8	1.1	1.2	1.6	2.4	1.6

TABLE 11: AVERAGE WIND SPEED (mph)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Kashgar	1	1	2	2	3	3	3	2	1	1	1	1
Lanchou	3	3	5	6	6	5	5	4	4	4	3	3
Paotow	11	11	14	14	14	7	—	9	10	10	11	10
Peking	8	8	10	10	9	7	4	4	5	8	8	7
Tulan	—	—	—	—	—	—	—	—	—	—	—	—
Tunhwang	—	—	—	—	—	—	—	—	—	—	—	—
Turfan	7	6	7	7	6	7	6	6	5	4	4	—
Urga	4	4	6	8	6	6	5	4	4	4	4	3
YUMA	6	6	7	7	6	6	6	5	5	5	5	5

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East Central Africa

TABLE 1: STATIONS USED IN TABLES OF MONTHLY VALUES

Station	Regional Subarea*	Elevation In Feet	Latitude	Longitude	Period of Record (Yrs.) Temp.	Prec.	Other
Addis Ababa (Ethiopia)	A	8,005	9°02'N	38°45'E	4	37	2
Asmara (Eritrea)	A	7,644	15°18'N	38°56'E	3½	40	1-3½
Bahrdar Girgis (Ethiopia)	A	6,037	11°36'N	37°25'E	4	5	4-5
Berbera (Br. Somaliland)	B	45	10°27'N	45°02'E	23	25	6-23
Gambela (Ethiopia)	A	1,345	8°15'N	34°35'E	26	30	26
Lugh Ferrandi (Somalia)	C	535	3°47'N	42°32'E	13	16	1-13
Massawa (Eritrea)	B	63	15°37'N	39°27'E	16	21	2-14
Mogadiscio (Somalia)	C	39	2°01'N	45°20'E	15	15	4-5
Mombasa (Kenya)	C	53	4°04'S	39°42'E	10	47	7
Nairobi (Kenya)	A	5,495	1°16'S	36°50'E	15	22	1-6
Yuma (USA)		206	32°40'N	114°36'W	80	84	44

* A = Highlands of Ethiopia, Eritrea, and Kenya
B = Red Sea and Gulf of Aden Littoral
C = Lowland Plain of Eastern Kenya and Somalia

TABLE 2: MEAN MONTHLY TEMPERATURE (°F)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr.
Addis Ababa	62	59	64	61	63	59	57	59	58	60	61	60	60
Asmara	63	65	67	67	66	65	65	64	63	62	62	59	64
Bahrdar Girgis	65	64	71	70	68	68	65	65	65	65	65	62	66
Berbera	77	77	79	83	88	96	97	97	92	84	80	78	86
Gambela	81	83	86	85	82	79	78	78	79	79	80	80	81
Lugh Ferrandi	89	92	93	91	88	87	85	85	87	88	88	89	88
Massawa	79	79	81	85	88	93	95	94	91	87	84	80	86
Mogadiscio	81	83	83	84	82	81	79	79	80	81	82	81	81
Mombasa	80	81	81	80	78	76	75	75	76	78	79	80	78
Nairobi	66	67	68	67	65	63	60	62	64	67	66	65	65
Yuma	55	59	64	70	77	85	91	90	85	73	62	55	72

TABLE 3: MEAN DAILY MAXIMUM TEMPERATURE (°F)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr.
Addis Ababa	76	76	78	77	79	77	72	71	73	76	74	74	75
Asmara	76	76	76	78	79	79	80	73	74	72	71	72	75
Bahrdar Girgis	82	83	86	83	80	79	74	74	76	79	78	79	79
Berbera	85	85	86	90	96	107	107	106	102	92	89	87	94
Gambela	98	100	101	98	93	89	87	87	89	92	94	96	94
Lugh Ferrandi	102	105	106	103	97	96	94	94	98	99	100	101	100
Massawa	85	85	89	92	95	101	104	102	98	97	90	87	93
Mogadiscio	89	89	89	91	88	86	84	84	87	87	88	88	88
Mombasa	86	86	87	84	82	80	79	79	81	83	84	85	83
Nairobi	79	81	80	76	74	73	71	71	77	78	75	75	76
Yuma	67	72	78	86	93	102	106	104	100	88	76	68	87

TABLE 4: MEAN DAILY MINIMUM TEMPERATURE (°F)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr.
Addis Ababa	45	47	50	50	49	50	50	50	50	47	44	44	48
Asmara	49	52	54	56	55	55	58	55	55	52	50	46	53
Bahrdar Girgis	48	45	56	56	57	57	57	57	54	51	52	45	53
Berbera	68	70	73	77	80	86	88	87	83	76	71	68	77
Gambela	64	67	70	71	70	69	69	68	68	67	66	65	68
Lugh Ferrandi	75	79	80	79	79	77	76	75	76	76	76	74	77
Massawa	72	72	74	77	80	84	88	87	85	81	78	73	79
Mogadiscio	74	78	76	77	76	75	74	73	73	75	76	74	75
Mombasa	74	75	76	75	73	72	70	70	71	73	74	75	73
Nairobi	53	53	56	57	56	53	51	52	52	55	56	54	54
Yuma	42	46	50	54	60	68	77	77	70	58	48	44	58

TABLE 5: ABSOLUTE MAXIMUM TEMPERATURE (°F)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr.
Addis Ababa	81	82	85	82	81	81	77	74	75	78	79	81	85
Asmara	81	82	84	87	83	85	79	79	77	77	77	78	87
Bahrdar Girgis	86	90	89	89	85	82	77	77	80	81	81	82	90
Berbera	94	92	95	108	112	117	116	115	114	107	98	96	117
Gambela	106	108	111	111	104	99	97	99	102	104	103	106	111
Lugh Ferrandi	112	114	119	122	110	105	99	102	104	109	111	109	122
Massawa	97	100	99	103	105	108	112	110	106	100	99	97	112
Mogadiscio	100	98	93	100	92	90	89	93	93	94	98	96	100
Mombasa	91	93	91	90	89	83	84	90	90	90	90	90	93
Nairobi	89	91	90	88	83	86	82	86	91	89	88	85	91
Yuma	84	92	100	107	120	119	120	119	123	108	96	83	123

TABLE 6: ABSOLUTE MINIMUM TEMPERATURE (°F)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr.
Addis Ababa	27	33	36	41	42	42	44	45	42	36	29	28	27
Asmara	39	39	43	46	47	48	50	48	43	43	40	36	36
Bahrdar Girgis	39	37	46	50	53	52	54	53	51	46	46	40	37
Berbera	55	54	52	66	69	72	69	63	64	64	61	60	52
Gambela	47	51	54	61	64	59	63	61	47	49	50	49	47
Lugh Ferrandi	70	77	79	77	76	72	75	68	73	68	66	66	66
Massawa	66	65	67	69	72	77	75	73	66	72	73	68	65
Mogadiscio	69	70	71	70	69	68	69	68	69	71	70	71	68
Mombasa	70	70	71	69	67	61	61	64	64	64	69	69	61
Nairobi	43	41	40	42	46	41	37	36	38	43	45	43	36
Yuma	22	25	31	38	39	50	61	58	50	38	29	22	22

TABLE 7: AVERAGE PRECIPITATION (INCHES)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Addis Ababa	.51	1.50	2.60	3.39	3.43	5.35	10.98	11.77	7.52	.79	.63	.24	48.71
Asmara	0	.11	.32	1.19	1.86	1.09	6.81	6.11	1.06	.48	.34	0	19.37
Bahrdar Girgis	.04	0	.39	1.06	3.07	4.57	16.61	11.30	9.68	3.94	1.02	.00	51.76
Berbera	.20	.20	.60	.50	.30	0	.10	.10	.10	.10	.20	.10	2.50
Gambela	.24	.39	1.38	3.23	5.94	6.69	8.46	9.35	7.28	3.54	1.81	.43	48.74
Lugh Ferrandi	.09	.17	1.04	4.21	2.20	.03	.11	T°	.07	2.83	2.66	.57	13.98
Massawa	1.61	.67	.63	.51	.43	0	.12	.24	.16	.32	.87	1.85	7.41
Mogadiscio	0	0	0	2.60	2.80	3.70	2.80	2.10	1.40	1.20	1.70	.70	19.00
Mombasa	1.06	.65	2.55	7.53	12.50	4.71	3.74	2.44	2.59	3.34	3.85	2.53	47.49
Nairobi	1.62	2.03	5.05	7.66	5.46	1.67	.64	1.13	.98	2.35	4.24	2.53	35.36
Yuma	.39	.41	.32	.09	.03	.01	.19	.57	.40	.27	.23	.47	3.38

TABLE 8: MEAN DEW POINT (°F)*

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr.
Addis Ababa	42	45	46	49	45	51	52	54	50	40	40	43	46
Asmara	33	33	28	43	45	33	49	48	44	47	48	43	41
Bahrdar Girgis	48	43	50	47	58	59	61	61	61	58	56	49	64
Berbera	68	68	71	75	76	73	73	75	75	73	69	67	72
Gambela	63	62	64	69	72	72	73	73	71	70	67	65	68
Lugh Ferrandi	62	61	64	71	69	67	67	65	65	70	68	65	66
Massawa	69	70	71	73	75	72	77	77	75	72	71	69	73
Mogadiscio	77	79	79	80	78	78	76	76	77	77	78	77	78
Mombasa	70	70	74	74	73	68	67	67	68	69	69	70	70
Nairobi	56	56	59	62	60	59	56	57	57	59	60	57	58
Yuma	32	33	35	37	42	47	59	64	57	47	36	34	44

* Computed from mean monthly temperature and relative humidity

TABLE 9: AVERAGE CLOUDINESS (10ths of Sky Covered)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr.
Addis Ababa	2.7	4.4	4.7	7.0	3.7	6.0	8.4	7.5	5.7	2.8	2.1	2.5	4.8
Asmara	3.5	5.1	2.7	2.6	1.7	4.6	8.0	7.6	4.2	2.5	1.3	1.6	3.8
Bahrdar Girgis	2.0	1.0	4.4	3.6	5.4	5.3	7.8	7.3	5.6	2.7	3.1	.8	4.1
Berbora	3.5	3.3	2.5	3.0	2.8	1.4	2.7	2.4	2.3	1.6	2.3	2.4	2.5
Gambela	2.5	3.1	3.3	4.2	5.2	5.9	5.9	6.0	5.2	5.5	3.1	2.3	4.2
Lugh Ferrandi	1.4	.4	5.3	5.8	3.6	3.1	6.4	4.2	3.7	3.9	4.3	3.0	3.8
Massawa	5.3	5.3	5.7	4.0	1.6	2.4	3.0	2.9	1.5	.4	1.1	2.1	2.9
Mogadiscio	2.4	2.7	2.7	3.3	3.2	4.6	4.9	4.3	3.6	3.6	3.3	3.3	3.5
Mombasa	4.7	4.3	4.1	4.8	6.5	5.5	5.7	5.6	5.1	4.3	4.1	4.9	5.0
Nairobi	4.1	4.1	5.1	6.3	6.5	6.4	6.3	6.6	5.8	6.5	7.1	5.9	5.9
Yuma	2.3	2.4	2.1	1.5	1.1	0.6	1.6	1.8	1.1	1.2	1.6	2.4	1.6

TABLE 10: PREVAILING WIND DIRECTION AND AVERAGE SPEED (MPH)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Addis Ababa	---	10SE	---	---	10E	---	---	7N	---	---	11E	---
Asmara	SE	SE	N	SE	SE	W	W	W	NE	NE	E	E
Bahrdar Girgis	4	4	5	4	3	4	2	2	2	2	3	4
Berbera	6NE	6NE	5NE	5NE	4NE	10SW	14SW	10SW	5NE	4NE	5NE	6NE
Gambela	5SE	5SE	4SE	3W	4SE	3SE	3SE	3SE	4SE	5SE	4SE	5SE
Lugh Ferrandi	---	NE	---	---	SW	---	---	SW	---	---	SE	---
Massawa	5NE	4NE	5NE	5NE	5NE	5NE	6NE	5NE	6NE	5NE	5NE	5NE
Mogadiscio	NE	NE	NE	NE	SW	SW	SW	SW	SW	SW	SE	SE
Mombasa	NW	NW	W,NW.	SW	SW	SW	SW	SW	S	S	SE	NW
Nairobi	NE	NE	NE	NE	SW	SW	SW	SW	SW	E	NE	E
Yuma	6N	6N	7W.	7W	6W	6SW	6SW	6S	5SW	5N	5N	5N

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North America

TABLE 1: STATIONS USED IN TABLES OF MONTHLY VALUES

Station	Elevation in feet	Latitude	Longitude	Period of Record (Yrs) Temp.	Prec.	Other
Amarillo (Texas)	3590	35° 14' N	101° 42' W	[illegible]-64	30	7-64
Bakersfield (Calif.)	489	35° 25' N	119° 03' W	30-49	30	7-20
Barstow (Calif.)	2105	34° 52' N	117° 20' W	14-18	27	18
Burns (Oregon)	4140	43° 35' N	119° 03' W	1[illegible]-30	30	11
Chihuahua (Mexico)	4690	28° 37' N	106° 50' W	20-21	2[illegible]	8-20
El Paso (Texas)	3920	31° 47' N	106° 30' W	30-76	30	7-64
Ely (Nevada)	6257	39° 17' N	114° 52' W	17-30	30	12-17
Greenland Ranch (Calif.)	-178	36° 2[illegible]' N	116° 57' W	20-44	19	----
Hanford (Wash.)	385	46° 34' N	119° 22' W	18	19	17
Hermosillo (Mexico)	778	29° 04' N	110° 58' W	5-14	—	3
La Paz (Mexico)	61	24° 09' N	110° 18' W	10	25-30	4-10
Las Vegas (Nevada)	2162	36° 05' N	115° 10' W	19-30	30	7
Los Angeles (Calif.)	338	34° 30' N	118° 15' W	30-78	30	78
Monterrey (Mexico)	1732	25° 42' N	100° 20' W	6-31	33	6-28
Needles (Calif.)	477	34° 50' N	114° 13' W	34-38	40	13
Phoenix (Arizona)	1083	33° 27' N	112° 04' W	30-60	30	10-16
Red Bluff (Calif.)	342	40° 09' N	122° 15' W	30-77	30	7-64
Reno (Nevada)	4397	39° 30' N	119° 47' W	30-68	30	6-50
Salt Lake City (Utah)	4260	40° 46' N	111° 54' W	27-30	30	24-26
San Antonio (Texas)	792	29° 27' N	98° 28' W	30-71	30	7-58
San Diego (Calif.)	87	32° 43' N	117° 10' W	30-84	30	7-67
Topolobampo (Mexico)	10	25° 36' N	109° 03' W	15	—	—
YUMA, ARIZONA	206	32° 40' N	114° 36' W	80	84	44

TABLE 2: MEAN MONTHLY TEMPERATURE °F

Stations	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr
Amarillo, TX	35	40	46	56	64	74	78	77	69	59	45	37	57
Bakersfield, CA	47	52	57	63	70	77	84	82	76	66	56	49	65
Barstow, CA	46	50	56	61	68	78	84	82	74	60	54	46	63
Burns, OR	24	31	39	47	54	60	70	67	58	47	36	28	47
Chihuahua, Chihuahua	50	53	60	66	73	79	77	75	71	65	55	50	65
El Paso, TX	43	49	54	63	72	80	81	80	75	65	52	45	63
Ely, NV	23	28	35	44	52	60	68	66	58	47	35	27	45
Greenland Ranch, CA	51	58	66	75	83	94	102	99	89	74	61	52	75
Hanford, WA	28	36	46	54	62	70	76	74	64	53	40	31	53
Hermosillo, Sonora	61	63	68	73	79	88	90	88	86	79	70	61	75
La Paz, Baja, CA	64	64	68	70	75	79	82	84	82	79	73	66	73
Las Vegas, NV	44	50	56	66	74	84	90	88	81	67	54	47	67
Los Angeles, CA	55	56	59	62	65	68	72	73	71	67	62	57	64
Monterrey, Nuevo Leon	58	63	68	74	78	82	82	82	78	72	64	58	71
Needles, CA	52	58	64	71	79	88	94	92	83	71	59	53	72
Phoenix, AZ	50	54	60	67	76	84	90	88	83	71	58	52	69
Red Bluff, CA	45	50	54	60	68	76	83	80	75	65	54	47	63
Reno, NV	31	36	41	48	55	62	70	67	60	51	40	33	50
Salt Lake City, UT	26	33	41	50	59	67	77	74	64	53	39	32	51
San Antonio, TX	51	55	61	69	76	82	84	84	79	71	60	53	69
San Diego, CA	55	56	58	60	63	66	69	70	69	65	61	57	62
Topolobampo, Sinaloa	66	68	68	72	77	84	86	86	86	82	75	68	77
Yuma, AZ	55	59	64	70	77	85	91	90	85	73	62	55	72

TABLE 3: MEAN DAILY MAXIMUM TEMPERATURE °F

Stations	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr
Amarillo	49	54	61	70	78	88	92	90	83	73	60	51	71
Bakersfield	57	64	70	76	85	93	101	98	92	81	70	59	79
Barstow	59	63	70	77	84	96	101	100	92	80	70	60	79
Burns	36	42	52	61	69	76	87	85	76	64	49	38	61
Chihuahua	65	69	76	83	91	95	91	88	85	81	71	67	80
El Paso	56	62	68	77	85	94	94	92	87	78	66	57	76
Ely	37	41	49	59	69	79	89	86	77	64	51	41	62
Greenland Ranch	65	72	80	90	99	110	116	114	106	90	76	66	90
Hanford	37	45	60	68	77	85	94	91	79	66	50	38	66
Hermosillo	77	79	82	88	95	102	100	99	97	91	86	72	88
La Paz	72	75	79	82	88	91	95	93	93	90	81	73	84
Las Vegas	55	62	69	79	88	99	105	103	96	82	67	58	80
Los Angeles	65	66	68	71	74	77	83	84	82	77	73	67	74
Monterrey	69	72	81	84	87	90	91	91	83	80	72	68	81
Needles	64	70	77	86	94	104	108	105	98	85	72	63	85
Phoenix	65	70	76	84	94	102	105	102	98	88	76	68	86
Red Bluff	53	59	64	71	81	90	99	96	90	78	65	55	75
Reno	46	51	56	65	73	81	92	90	82	70	57	47	68
Salt Lake City	36	43	52	63	73	82	92	90	79	66	50	40	64
San Antonio	61	66	73	80	87	92	95	96	90	83	71	64	80
San Diego	64	65	66	68	70	72	76	76	76	73	71	66	70
Topolobampo	75	79	77	82	86	93	93	93	95	91	84	75	84
Yuma	67	72	78	86	93	102	106	104	100	88	76	68	87

TABLE 4: MEAN DAILY MINIMUM TEMPERATURE °F

Stations	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr
Amarillo	22	26	31	41	50	59	64	63	56	44	34	24	44
Bakersfield	36	41	44	50	56	61	67	65	60	52	43	38	51
Barstow	31	34	40	45	51	60	67	65	57	47	37	30	47
Burns	12	20	26	32	39	45	52	49	40	31	24	17	32
Chihuahua	35	39	44	49	57	65	65	63	60	51	42	36	51
El Paso	31	36	41	49	58	66	69	68	63	52	38	33	50
Ely	9	15	21	28	34	40	48	46	38	29	19	13	28
Greenland Ranch	37	44	51	60	68	78	88	84	72	58	46	38	60
Hanford	20	27	33	39	46	54	60	58	48	39	30	23	40
Hermosillo	48	50	54	59	64	73	79	77	76	66	57	50	63
La Paz	55	54	54	57	61	68	77	75	75	70	64	57	63
Las Vegas	33	39	44	53	60	68	76	74	65	53	40	36	53
Los Angeles	45	47	49	52	55	58	62	62	60	56	51	48	54
Monterrey	51	52	59	64	69	72	73	73	70	64	56	51	63
Needles	39	44	49	55	63	71	80	78	67	55	46	40	57
Phoenix	34	39	44	50	58	66	75	74	67	54	41	37	53
Red Bluff	38	41	44	48	54	61	66	64	59	52	44	38	51
Reno	17	22	25	30	37	42	47	45	39	31	23	19	31
Salt Lake City	17	24	30	37	45	52	61	59	49	39	28	23	39
San Antonio	40	44	50	58	65	72	73	73	69	60	48	42	58
San Diego	46	48	50	53	57	60	63	64	62	57	51	47	55
Topolobampo	55	57	59	63	68	77	77	77	77	72	64	57	66
Yuma	42	46	50	54	60	68	77	77	70	58	48	44	58

TABLE 5: ABSOLUTE MAXIMUM TEMPERATURE °F

Stations	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr
Amarillo	83	84	96	94	102	108	106	106	102	95	86	83	108
Bakersfield	82	88	94	100	110	113	118	117	112	104	95	87	118
Barstow	86	86	94	99	111	113	114	112	111	97	90	87	114
Burns	56	64	73	86	93	95	103	100	100	86	70	55	103
Chihuahua	81	88	90	95	103	106	100	102	97	94	88	82	106
El Paso	88	86	93	95	104	106	107	103	103	94	85	77	107
Ely	68	65	69	77	87	99	96	95	93	81	71	65	99
Greenland Ranch	85	92	100	109	120	124	134	127	121	110	93	86	134
Hanford	65	71	82	95	101	110	111	110	99	86	72	68	111
Hermosillo	87	90	93	95	102	113	115	107	115	114	108	98	115
La Paz	78	87	91	99	99	99	101	99	97	99	90	83	101
Las Vegas	76	82	89	99	109	116	117	116	113	100	84	78	117
Los Angeles	90	92	99	100	103	105	109	106	110	104	96	92	110
Monterrey	98	96	98	105	106	100	100	102	99	91	92	94	106
Needles	83	90	96	106	118	122	125	122	116	112	90	86	125
Phoenix	85	92	95	104	114	118	118	115	118	105	96	88	118
Red Bluff	79	84	91	98	110	114	115	114	114	104	93	79	115
Reno	68	76	79	88	98	100	106	103	101	89	80	69	106
Salt Lake City	60	68	77	85	93	103	106	103	98	87	74	66	106
San Antonio	87	94	97	100	103	106	106	107	103	99	91	90	107
San Diego	88	89	99	96	98	96	100	98	110	96	93	84	110
Topolobampo	85	88	94	99	102	104	100	104	106	102	95	95	106
Yuma	84	92	100	107	120	119	120	119	123	108	96	83	123

TABLE 6: ABSOLUTE MINIMUM TEMPERATURE °F

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr
Amarillo	-11	-16	-3	13	26	38	51	48	32	15	4	-6	-16
Bakersfield	14	20	21	30	34	38	46	44	30	31	22	13	13
Barstow	12	16	21	30	34	40	50	48	39	27	14	12	12
Burns	-20	-16	-3	14	19	29	34	31	24	13	-17	-8	-20
Chihuahua	17	14	21	25	25	52	55	51	43	32	22	11	11
El Paso	-6	5	14	26	36	46	56	52	41	26	11	-5	-6
Ely	-27	-25	-13	6	7	19	30	27	16	8	-9	-22	-27
Greenland Ranch	15	21	30	35	42	49	62	65	41	32	24	19	15
Hanford	-23	-19	12	20	29	35	42	40	25	17	3	-27	-27
Hermosillo	33	33	37	45	50	50	57	57	57	26	38	35	26
La Paz	46	47	41	52	54	57	57	57	57	53	51	46	41
Las Vegas	8	17	19	31	38	48	56	54	43	32	15	14	8
Los Angeles	28	28	31	36	40	46	49	49	44	40	34	30	28
Monterrey	26	26	32	45	59	63	68	69	56	48	39	37	26
Needles	21	23	28	33	39	46	60	60	40	36	25	23	21
Phoenix	16	22	29	32	39	49	61	58	49	36	25	22	16
Red Bluff	17	22	26	28	33	42	53	50	43	30	25	17	17
Reno	-19	-12	-3	13	16	25	35	32	21	13	5	-7	-19
Salt Lake City	-22	-30	5	14	27	35	41	39	30	18	-14	-21	-30
San Antonio	0	4	21	34	44	48	60	57	41	32	22	14	0
San Diego	25	34	36	39	45	50	54	54	50	44	36	32	25
Topolobampo	46	48	50	52	54	70	66	69	64	59	52	46	46
Yuma	22	25	31	38	39	50	61	58	50	38	29	22	22

TABLE 7: MEAN MONTHLY PRECIPITATION (IN INCHES)

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr
Amarillo	0.6	0.6	1.0	1.5	3.0	3.3	2.4	3.0	2.3	1.9	0.9	0.7	21.1
Bakersfield	1.0	1.1	1.1	0.8	0.4	0.1	*	*	0.1	0.4	0.4	1.0	6.4
Barstow	0.2	0.2	0.2	0.4	0.2	0.5	0.8	0.6	0.6	0.2	0.1	0.1	4.1
Burns	1.5	1.2	0.8	0.8	0.8	0.9	0.3	0.3	0.4	0.8	1.2	1.4	10.3
Chihuahua	0.2	0.4	0.3	0.2	0.2	1.6	3.6	3.7	3.3	0.9	0.5	0.4	15.4
El Paso	0.4	0.4	0.3	0.3	0.4	0.6	1.3	1.3	1.1	0.8	0.4	0.5	7.8
Ely	0.9	0.9	1.3	1.2	1.2	0.5	0.6	0.9	0.7	0.8	0.7	0.9	10.5
Greenland Ranch	0.1	*	0.1	0.1	0.2	0.1	0.3	0.3	0.2	*	0.1	*	1.5
Hanford	0.9	0.6	0.2	0.4	0.4	0.4	0.1	0.2	0.3	0.5	1.0	0.8	5.9
Hermosillo	0.1	0.6	0.2	0.1	0.1	0.1	2.8	3.3	2.5	1.6	0.2	1.0	12.2
La Paz	0.2	0.3	*	*	*	*	0.3	1.6	2.9	0.5	0.6	1.0	7.5
Las Vegas	0.5	0.6	0.4	0.2	0.2	0.1	0.5	0.5	0.3	0.3	0.2	0.6	4.4
Los Angeles	2.4	3.4	2.4	1.2	0.3	0.1	T	*	0.3	0.5	1.0	3.1	14.5
Monterrey	0.6	0.7	0.8	1.3	1.3	3.0	2.3	2.4	5.2	3.0	1.5	0.8	22.8
Needles	0.4	0.7	0.3	0.3	0.4	0.5	0.6	0.5	0.4	0.2	0.1	0.1	4.5
Phoenix	0.6	0.8	0.7	0.4	0.2	0.1	0.7	1.0	1.0	0.4	0.5	1.0	7.2
Red Bluff	3.7	3.5	2.6	1.8	1.1	0.5	*	0.1	0.3	1.5	2.3	4.2	21.6
Reno	1.0	1.1	0.7	0.5	0.5	0.4	0.2	0.2	0.2	0.6	0.6	0.9	7.0
Salt Lake City	1.2	1.2	1.7	1.8	1.6	0.9	0.6	1.0	0.7	1.3	1.4	1.3	14.7
San Antonio	1.8	1.6	2.1	3.0	3.5	3.2	1.9	2.0	3.4	2.1	1.4	1.9	27.9
San Diego	1.7	2.3	1.9	0.8	0.3	*	*	0.1	0.2	0.6	0.8	2.6	10.9
Topolobampo	0.2	0.3	0.2	*	0.1	0.2	1.6	7.5	2.2	2.9	0.3	2.2	14.0
Yuma	0.4	0.4	0.3	0.1	*	*	0.2	0.6	0.4	0.3	0.2	0.5	3.4

* Less than 0.05 inch.

TABLE 8: MEAN CLOUDINESS (IN TENTHS OF SKY COVERED)

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr
Amarillo	4.2	4.5	4.2	4.3	4.4	3.8	4.0	3.8	3.7	3.7	3.6	4.2	4.0
Bakersfield	5.7	5.2	5.4	4.3	2.9	1.3	1.1	0.8	1.2	2.4	4.4	6.5	3.4
Barstow	—	—	—	—	—	—	—	—	—	—	—	—	—
Burns	7.2	7.1	7.1	6.1	6.1	5.2	2.5	3.3	3.3	5.0	6.8	7.6	5.6
Chihuahua	4.8	4.9	4.7	4.6	4.5	4.8	6.6	6.6	5.1	4.3	5.1	5.2	5.1
El Paso	3.7	3.6	3.4	2.9	2.6	2.4	4.0	3.8	3.1	2.7	2.8	3.5	3.2
Ely	6.0	5.9	6.2	5.9	5.9	4.2	3.8	3.2	3.0	4.0	5.8	6.3	5.0
Greenland Ranch	—	—	—	—	—	—	—	—	—	—	—	—	—
Hanford	—	—	—	—	—	—	—	—	—	—	—	—	—
Hermosillo	—	—	—	—	—	—	—	—	—	—	—	—	—
La Paz	—	—	—	—	—	—	—	—	—	—	—	—	—
Las Vegas	5.2	3.8	4.2	3.7	3.2	1.7	2.8	2.1	1.3	2.0	3.5	4.9	3.2
Los Angeles	4.0	4.2	4.4	4.4	4.4	3.7	2.9	2.6	2.8	3.1	3.0	3.7	3.6
Monterrey	4.5	4.2	4.9	5.0	5.2	4.6	4.7	4.1	5.2	5.0	5.1	4.8	4.8
Needles	—	—	—	—	—	—	—	—	—	—	—	—	—
Phoenix	4.8	4.4	4.3	3.7	2.8	1.9	3.9	3.5	2.2	2.9	3.2	4.7	3.5
Red Bluff	6.4	6.1	6.2	5.4	4.8	3.3	1.3	1.7	2.1	4.0	6.0	7.3	4.6
Reno	5.3	5.3	4.9	4.7	4.1	3.1	1.8	1.8	2.1	3.3	4.3	5.5	3.9
Salt Lake City	6.9	6.9	6.5	6.0	5.3	4.3	3.5	3.3	3.3	4.3	5.6	7.0	5.2
San Antonio	5.7	5.7	5.5	5.5	5.4	4.6	4.5	4.1	4.5	4.2	5.1	5.5	5.0
San Diego	4.5	4.7	4.6	4.7	4.9	4.3	3.7	3.4	3.3	3.5	3.3	4.3	4.1
Topolobampo	—	—	—	—	—	—	—	—	—	—	—	—	—
Yuma	2.3	2.4	2.1	1.5	1.1	0.6	1.6	1.8	1.1	1.2	1.6	2.4	1.6

TABLE 9: MEAN DEW POINT (°F)

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr
Amarillo	25	27	30	39	49	57	61	61	54	45	32	36	42
Bakersfield	34	42	44	45	46	47	50	51	49	47	43	41	46
Barstow	—	—	—	—	—	—	—	—	—	—	—	—	—
Burns	18	24	29	31	36	42	42	40	36	32	28	9	32
Chihuahua	47	47	49	53	58	68	70	72	71	64	54	51	59
El Paso	26	27	26	29	35	45	57	57	52	43	31	27	38
Ely	14	16	21	24	29	30	42	36	29	28	24	18	27
Greenland Ranch	—	—	—	—	—	—	—	—	—	—	—	—	—
Hanford	—	—	—	—	—	—	—	—	—	—	—	—	—
Hermosillo	—	—	—	—	—	—	—	—	—	—	—	—	—
La Paz	52	53	54	56	59	64	67	69	70	66	59	54	60
Las Vegas	26	28	30	31	31	33	46	46	36	35	28	27	34
Los Angeles	41	42	47	51	54	58	61	62	60	54	46	41	52
Monterrey	43	48	53	59	65	68	68	68	67	61	54	52	58
Needles	—	—	—	—	—	—	—	—	—	—	—	—	—
Phoenix	34	36	37	39	39	59	60	63	56	47	39	36	45
Red Bluff	37	40	42	43	48	50	51	51	48	45	43	40	46
Reno	23	27	27	30	36	39	42	40	39	34	29	26	33
Salt Lake City	20	26	30	34	39	45	49	47	41	37	30	27	36
San Antonio	41	44	49	57	66	71	72	71	68	60	49	43	57
San Diego	44	47	48	52	54	57	62	63	61	56	49	46	53
Topolobampo	—	—	—	—	—	—	—	—	—	—	—	—	—
Yuma	32	33	37	37	42	47	59	64	57	47	36	34	44

TABLE 10: MEAN WIND SPEED (MPH)

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Amarillo	12	13	14	14	13	13	11	11	12	12	12	11
Bakersfield	5	6	6	7	8	8	7	7	6	5	5	5
Barstow	-	-	-	-	-	-	-	-	-	-	-	-
Burns	-	-	-	-	-	-	-	-	-	-	-	-
Chihuahua	5	5	5	7	4	4	3	3	4	4	3	4
El Paso	9	10	11	11	11	10	9	8	8	8	9	9
Ely	11	12	12	11	12	12	11	11	11	11	11	11
Greenland Ranch	-	-	-	-	-	-	-	-	-	-	-	-
Hanford	-	-	-	-	-	-	-	-	-	-	-	-
Hermosillo	4	4	3	5	4	4	4	5	4	3	4	5
La Paz	6	6	5	6	5	5	5	4	4	5	6	5
Las Vegas	6	7	9	9	10	10	9	9	8	7	6	6
Los Angeles	6	7	7	6	6	6	6	6	6	6	6	6
Monterrey	2	3	3	3	3	4	4	3	2	2	2	2
Needles	-	-	-	-	-	-	-	-	-	-	-	-
Phoenix	4	5	6	6	6	6	6	5	5	4	4	4
Red Bluff	7	7	7	7	7	7	6	5	6	6	6	6
Reno	6	6	8	8	8	8	7	7	6	6	6	6
Salt Lake City	8	8	9	9	10	10	10	10	9	9	8	8
San Antonio	8	9	10	10	9	9	8	7	8	8	8	8
San Diego	6	6	7	7	7	7	7	7	6	6	5	5
Topolobampo	-	-	-	-	-	-	-	-	-	-	-	-
Yuma	6	6	7	7	6	6	6	6	5	5	5	5

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South America

TABLE 1: STATIONS USED IN TABLES OF MONTHLY VALUES

Station	Elevation in Feet	Latitude	Longitude	Period of Record (Yrs) Temp.	Prec.	Other
Ambato Ecuador	8,596	1° 10' S	78° 42' W	5	5	3
Andagoya Colombia	250	5° 04' N	76° 55' W	8	15	--
Belem Brazil	33	1° 27' S	48° 27' W	12	15	10
Buenos Aires Argentina	25	34° 35' S	58° 27' W	68	53	45
Caracas Venezuela	3,420	10° 30' N	66° 53' W	22	46	16
Col. Sarmiento Argentina	886	45° 36' S	69° 05' W	20	20	12
[illegible] Brazil	541	15° 35' S	56° 06' W	15	29	10
[illegible] Peru	10,581	13° 33' S	71° 55' W	4	12	3-5
[illegible] Br. Guiana	625	2° 30' N	59° 30' W	9	9	--
Georgetown Br. Guiana	6	6° 50' N	58° 12' W	41	37	12
Iquique Chile	30	20° 12' S	70° 11' W	13	40	8
Lima Peru	518	12° 02' S	77° 02' W	10	18	5
Manaos Brazil	147	3° 10' S	60° 00' W	10	27	10
Merida Venezuela	5,384	8° 36' N	71° 05' W	9	19	9
Morro do Chapeu Brazil	997	11° 31' S	41° 14' W	6	13	6
Natal Brazil	52	5° 46' S	35° 12' W	18	13	5-9
Porto Velho Brazil	407	8° 46' S	63° 55' W	14	14	--
Posadas Argentina	138	27° 24' S	55° 55' W	11	20	11
Pucallpa Peru	495	8° 23' S	74° 32' W	7	7	--
Rio de Janeiro Brazil	149	22° 54' S	43° 10' W	38	84	29
Santiago Chile	1,705	33° 27' S	70° 42' W	14	58	14
Sucre Bolivia	9,344	19° 03' S	65° 17' W	5	52	3
Tucuman Argentina	1,465	26° 50' S	65° 10' W	40	40	12
Ushuaia Argentina	26	54° 50' S	68° 20' W	20	20	4
Yuma United States	206	32° 40' N	114° 36' W	80	84	44

TABLE II: MEAN MONTHLY TEMPERATURE (°F)

STATIONS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YR
AMBATO	58	58	58	58	57	56	54	54	56	58	58	58	57
ANDAGOYA	82	82	82	82	82	82	81	81	81	82	81	81	82
BELEM	79	79	79	80	80	80	80	80	80	80	80	80	80
BUENOS AIRES	74	73	69	61	55	50	49	51	55	60	66	71	61
CARACAS	64	65	66	68	69	69	68	68	68	68	67	65	67
COL. SARMIENTO	65	64	59	52	45	38	37	42	46	53	58	62	52
CUYABA	80	79	79	78	75	72	72	75	78	81	81	80	78
CUZCO	54	54	54	52	52	50	48	51	53	54	55	54	53
DADANAWA	82	82	83	83	82	81	81	82	84	85	85	82	83
GEORGETOWN	79	79	80	80	80	80	80	81	81	81	81	80	80
IQUIQUE	69	69	67	65	62	61	59	60	61	63	66	68	64
LIMA	73	74	74	70	66	63	61	61	61	63	66	69	67
MANAOS	79	80	79	79	80	80	80	81	82	82	81	80	80
MERIDA	65	66	66	68	68	68	68	68	68	67	66	65	67
MORRO DO CHAPEU	69	69	69	68	65	63	62	62	65	68	68	68	66
NATAL	82	81	81	79	79	77	75	76	78	80	81	81	79
PORTO VELHO	81	81	81	81	81	80	80	82	83	82	82	81	81
POSADAS	80	79	77	70	64	60	61	61	67	70	74	78	70
PUCALLPA	80	80	80	79	79	78	76	79	80	80	80	80	79
RIO DE JANEIRO	78	79	77	75	72	69	68	69	70	72	74	76	73
SANTIAGO	69	68	65	59	53	48	48	50	54	58	63	67	59
SUCRE	55	55	56	55	52	50	50	53	56	56	58	57	54
TUCUMAN	77	75	72	66	60	54	54	57	64	69	73	75	66
USHUAIA	50	49	47	41	37	33	34	35	39	43	44	49	42
YUMA	55	59	64	70	77	85	91	90	85	73	62	55	72

TABLE III: MEAN DAILY MAXIMUM TEMPERATURE (°F)

STATIONS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YR
AMBATO	70	69	70	70	68	67	65	66	67	70	72	70	69
ANDAGOYA	90	89	90	90	89	89	89	89	89	90	88	88	89
BELEM	86	86	86	87	88	88	88	88	89	89	89	88	88
BUENOS AIRES	84	84	78	71	64	58	57	59	63	69	75	82	70
CARACAS	75	77	78	80	80	78	77	78	79	79	77	75	78
COL. SARMIENTO	78	77	70	62	54	46	45	51	57	66	70	74	62
CUYABA	91	91	91	91	88	88	90	93	92	92	91	90	91
CUZCO	64	63	64	66	65	64	63	66	66	67	68	65	65
DADANAWA	93	92	93	92	90	89	90	92	94	97	96	93	93
GEORGETOWN	84	83	84	85	85	85	85	86	87	87	87	84	85
IQUIQUE	77	77	75	72	69	66	65	66	67	70	73	75	71
LIMA	80	82	81	77	72	67	65	65	66	68	72	76	72
MANAOS	83	88	88	87	88	88	89	91	92	92	91	90	89
MERIDA	73	74	74	75	76	76	77	77	77	75	74	73	75
MORRO DO CHAPEU	77	79	81	78	74	72	71	72	76	80	80	81	77
NATAL	86	85	86	86	85	83	82	82	84	85	85	86	85
PORTO VELHO	85	85	85	86	86	86	88	90	91	88	87	85	87
POSADAS	93	92	90	83	76	70	71	74	78	82	87	91	82
PUCALLPA	89	88	88	87	88	88	87	91	91	90	88	89	89
RIO DE JANEIRO	84	85	83	80	77	75	75	76	75	77	79	82	79
SANTIAGO	85	84	80	74	65	58	59	62	66	72	78	83	72
SUCRE	63	61	64	63	63	61	61	65	67	65	68	66	64
TUCUMAN	90	88	83	77	70	66	67	71	79	82	86	87	79
USHUAIA	59	59	56	51	42	41	41	44	46	55	55	57	51
YUMA	67	72	78	86	93	102	106	104	100	88	76	68	87

TABLE IV: MEAN DAILY MINIMUM TEMPERATURE (°F)

STATIONS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YR
AMBATO	49	48	48	49	49	47	46	45	46	47	47	48	47
ANDAGOYA	74	74	74	75	74	74	74	74	73	74	74	74	74
BELEM	72	72	73	73	73	72	71	71	71	71	71	72	72
BUENOS AIRES	64	63	60	54	47	42	42	43	47	51	56	60	52
CARACAS	56	56	57	60	62	62	61	61	61	61	60	58	60
COL. SARMIENTO	52	51	47	42	36	31	29	33	36	41	46	49	41
CUYABA	73	73	72	70	66	63	61	63	67	71	72	72	69
CUZCO	44	44	43	41	39	36	33	37	40	42	42	43	40
DADANAWA	72	71	72	73	73	72	72	72	73	73	73	72	72
GEORGETOWN	74	74	75	76	75	75	75	75	76	76	75	75	75
IQUIQUE	62	62	60	57	56	55	54	54	55	57	58	60	57
LIMA	67	67	66	63	60	58	57	57	56	58	59	63	61
MANAOS	75	75	75	75	75	75	74	75	75	76	76	75	75
MERIDA	57	58	58	60	61	60	59	59	59	60	59	57	59
MORRO DO CHAPEU	59	60	60	59	56	54	53	53	54	57	58	59	57
NATAL	76	76	75	73	72	71	69	69	72	75	76	77	73
PORTO VELHO	76	76	76	76	75	73	72	74	76	76	76	76	75
POSADAS	68	67	65	60	54	50	50	52	55	57	61	66	59
PUCALLPA	72	72	72	71	69	68	66	67	69	71	71	72	70
RIO DE JANEIRO	73	73	72	69	66	64	63	63	65	66	68	71	68
SANTIAGO	53	52	49	45	41	37	37	39	42	45	48	51	45
SUCRE	48	48	47	45	40	38	37	40	44	46	48	49	44
TUCUMAN	67	67	64	58	52	45	44	45	52	58	62	65	57
USHUAIA	41	42	39	36	28	30	28	28	31	35	36	39	35
YUMA	42	46	50	54	60	68	77	77	70	58	48	44	58

TABLE V: ABSOLUTE MAXIMUM TEMPERATURE (°F)

STATIONS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YR
AMBATO	81	82	79	79	76	74	75	77	75	78	81	78	82
ANDAGOYA	96	95	98	97	96	100	100	98	100	99	95	96	100
BELEM	91	91	91	91	91	92	91	91	91	93	94	92	94
BUENOS AIRES	99	103	93	85	79	75	76	76	86	87	95	100	103
CARACAS	83	88	91	88	89	85	84	86	85	86	84	83	91
COL. SARMIENTO	99	96	93	83	71	64	68	67	76	86	92	99	99
CUYABA	--	--	--	--	--	--	--	--	--	--	--	--	--
CUZCO	75	79	76	74	76	76	76	75	80	79	80	80	80
DADANAWA	98	101	99	98	96	97	95	100	100	103	100	102	103
GEORGETOWN	88	89	89	89	90	88	90	90	91	92	91	89	92
IQUIQUE	90	92	89	85	80	86	82	78	80	85	89	91	92
LIMA	87	88	90	86	88	85	76	74	77	77	85	86	90
MANAOS	99	97	97	94	95	95	94	96	99	99	99	102	102
MERIDA	79	82	81	84	83	82	85	83	83	83	80	78	85
MORRO DO CHAPEU	84	86	90	88	82	86	80	80	86	89	89	91	91
NATAL	89	90	90	89	91	89	87	87	89	89	89	88	91
PORTO VELHO	96	96	96	96	96	96	96	100	100	104	98	97	104
POSADAS	--	--	--	--	--	--	--	--	--	--	--	--	--
PUCALLPA	--	--	--	--	--	--	--	--	--	--	--	--	--
RIO DE JANEIRO	102	98	97	94	95	90	91	93	100	102	100	102	102
SANTIAGO	96	98	94	88	87	80	81	85	88	92	97	99	99
SUCRE	80	75	82	78	72	72	74	78	77	77	79	78	82
TUCUMAN	118	111	100	95	90	97	99	98	106	108	110	106	118
USHUAIA	81	79	72	65	59	57	54	59	61	70	73	80	8[illegible]
YUMA	84	92	100	107	120	119	120	119	123	108	96	83	12[illegible]

TABLE VI: ABSOLUTE MINIMUM TEMPERATURE (°F)

STATIONS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YR
ANDATO	37	36	32	40	39	33	32	34	35	34	33	33	32
ANDAGOYA	68	71	70	70	72	70	70	70	70	69	68	65	66
BELEM	69	68	69	69	68	69	64	68	65	68	67	67	64
BUENOS AIRES	47	46	44	35	33	30	28	32	30	37	40	46	28
CARACAS	47	46	45	51	52	53	52	53	53	54	51	47	45
COL. SARMIENTO	34	34	27	18	11	8	-27	3	14	19	29	32	-27
CUYABA	--	--	--	--	--	--	--	--	--	--	--	--	--
CUZCO	35	36	38	32	32	28	28	28	32	31	33	36	28
DADANAWA	66	68	68	68	70	69	68	70	70	70	70	69	66
GEORGETOWN	68	69	69	71	70	69	70	71	69	70	69	70	68
IQUIQUE	52	53	48	47	46	45	43	42	44	46	48	50	42
LIMA	57	60	59	57	51	50	52	49	52	54	53	54	49
MANAOS	70	70	69	69	70	66	69	70	71	71	70	69	66
MERIDA	52	52	53	54	56	55	54	54	54	55	53	52	52
MORRO DO CHAPEU	52	54	54	51	47	47	44	49	47	49	52	53	44
NATAL	68	68	66	61	65	64	63	63	64	68	65	58	56
PORTO VELHO	70	70	70	71	57	56	57	58	62	70	64	68	56
POSADAS	--	--	--	--	--	--	--	--	--	--	--	--	--
PUCALLPA	--	--	--	--	--	--	--	--	--	--	--	--	--
RIO DE JANEIRO	60	63	64	60	56	52	52	53	50	57	59	56	50
SANTIAGO	43	43	38	33	27	26	24	26	31	32	37	36	24
SUCRE	40	41	38	37	29	27	25	30	29	33	40	41	25
TUCUMAN	52	50	46	36	31	26	26	27	31	36	44	44	26
USHUAIA	28	28	27	21	-4	-1	-3	9	18	24	26	27	-4
YUMA	22	25	31	38	39	50	61	58	50	38	29	22	22

TABLE VII: MEAN MONTHLY PRECIPITATION (IN INCHES)

STATIONS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YR
AMBATO	1.8	1.7	2.2	2.6	2.1	0.7	0.9	0.7	1.0	1.5	1.4	1.3	17.9
ANDAGOYA	24.9	21.4	19.5	26.1	25.5	25.8	23.3	25.3	24.6	22.7	22.4	19.5	281.0
BELEM	9.2	13.6	17.3	16.7	11.7	9.1	3.1	3.0	1.8	3.3	1.1	4.2	94.1
BUENOS AIRES	3.0	2.4	4.5	3.1	3.0	2.6	2.2	2.4	3.0	3.5	3.0	3.9	36.6
CARACAS	0.9	0.4	0.6	1.3	3.1	4.0	4.3	4.3	4.2	4.3	3.7	1.8	32.8
COL. SARMIENTO	0.2	0.4	0.4	0.5	0.8	0.5	0.8	0.4	0.5	0.2	0.2	0.2	5.1
CUYABA	10.0	9.6	8.1	4.0	2.2	0.5	0.3	1.1	1.8	5.2	6.0	8.1	56.9
CUZCO	6.5	5.4	4.4	2.0	0.6	0.2	0.2	0.4	1.0	2.7	2.9	5.5	31.8
DADANAWA	1.3	2.2	2.2	5.6	7.7	13.8	10.2	8.0	2.6	1.6	1.1	2.0	58.3
GEORGETOWN	7.3	5.9	6.1	6.7	11.1	12.1	9.6	6.4	2.8	2.3	5.8	11.3	87.3
IQUIQUE	*	*	*	*	*	*	0.0	*	*	*	*	0.0	0.0
LIMA	0.0	*	*	*	0.1	0.2	0.4	0.4	0.4	0.2	0.1	*	1.8
MANAOS	9.8	9.2	9.8	8.6	7.0	3.8	2.3	1.4	2.0	4.1	6.1	7.8	71.9
MERIDA	2.4	1.5	3.3	7.0	10.1	7.4	4.9	5.8	6.9	10.3	8.5	3.4	71.5
MORRO DO CHAPEU	3.9	4.3	4.0	3.5	1.8	2.0	1.9	1.5	1.0	2.1	3.9	4.0	[illegible]
NATAL	3.1	4.9	5.7	9.0	7.1	10.5	7.7	3.6	3.4	1.0	0.6	1.2	[illegible]
PORTO VELHO	14.6	13.5	15.0	8.9	5.0	1.4	0.6	2.1	3.6	8.9	11.2	13.9	[illegible]
POSADAS	4.5	5.6	5.3	6.1	4.9	5.0	4.5	3.2	3.6	5.8	5.3	5.0	53.8
PUCALLPA	4.2	5.1	7.3	7.4	4.1	2.3	2.1	1.8	2.6	5.5	7.5	7.2	58.[illegible]
RIO DE JANEIRO	4.9	4.8	5.1	4.2	3.1	2.1	1.6	1.7	2.6	3.1	4.1	5.4	42.6
SANTIAGO	0.1	0.1	0.2	0.5	2.5	3.3	3.0	2.2	1.2	0.6	0.3	0.2	14.[illegible]
SUCRE	7.3	4.9	3.7	1.6	0.2	0.1	0.2	0.3	1.0	1.6	2.6	4.3	27.8
TUCUMAN	7.1	6.7	5.9	2.7	1.1	0.6	0.4	0.5	0.7	2.3	3.7	6.6	38.3
USHUAIA	1.7	2.1	1.7	1.9	1.5	1.6	1.2	0.9	1.2	1.5	1.9	1.8	19.0
YUMA	0.4	0.4	0.3	0.1	*	*	0.2	0.6	0.4	0.3	0.2	0.5	3.4

*LESS THAN 0.05 INCH

TABLE VIII: MEAN CLOUDINESS (IN TENTHS OF SKY COVERED)

STATIONS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YR
ANDATO	7.6	7.5	7.9	7.9	7.9	7.5	8.1	7.9	7.7	7.4	7.1	7.4	7.7
ANDAGOYA	---	---	---	---	---	---	---	---	---	---	---	---	---
BELEM	6.5	7.4	7.4	7.1	6.1	5.1	4.4	4.0	3.8	3.9	4.2	5.3	6.6
BUENOS AIRES	4.0	4.2	4.0	4.0	5.1	5.8	5.0	4.8	4.7	5.3	4.5	4.1	4.6
CARACAS	5.2	4.9	5.8	7.2	7.9	8.4	7.9	7.5	7.1	6.9	7.1	[illegible]	[illegible]
COL. SARMIENTO	6.2	6.0	6.4	6.2	6.2	6.2	6.1	5.8	6.2	6.1	6.8	6.4	[illegible]
CUYABA	7.3	7.1	7.1	5.6	4.4	4.3	3.6	3.5	4.8	6.0	6.6	7.6	[illegible]
CUZCO	6.4	6.4	6.2	5.2	4.4	3.8	3.4	3.4	4.7	5.3	5.4	6.8	5.1
DADANAWA	---	---	---	---	---	---	---	---	---	---	---	---	---
GEORGETOWN	6.2	5.8	6.0	6.2	6.3	6.4	6.0	5.7	5.3	5.6	5.8	6.3	6.0
IQUIQUE	4.8	3.6	3.6	4.0	5.7	7.9	8.5	8.5	8.2	7.0	5.7	4.3	[illegible]
LIMA	5.9	5.6	4.8	4.7	6.2	8.2	8.9	9.1	8.6	7.9	6.5	6.0	[illegible]
MANAOS	6.6	6.9	6.8	6.9	6.6	6.3	5.5	6.0	6.1	6.3	6.4	6.7	6.4
MERIDA	---	---	---	---	---	---	---	---	---	---	---	---	---
MORRO DO CHAPEU	5.6	6.2	5.8	5.8	6.0	5.8	5.9	6.0	5.4	5.7	5.9	6.2	5.9
NATAL	5.1	5.4	5.1	5.8	5.8	6.1	5.1	4.7	4.2	4.1	4.4	5.0	[illegible]
PORTO VELHO	---	---	---	---	---	---	---	---	---	---	---	---	---
POSADAS	5.2	5.2	4.9	5.2	5.1	5.8	5.4	5.3	5.5	5.1	4.4	5.1	5.2
PUCALLPA	---	---	---	---	---	---	---	---	---	---	---	---	---
RIO DE JANEIRO	6.6	5.9	6.0	5.9	5.6	5.3	5.0	5.6	7.0	6.9	6.9	6.8	6.1
SANTIAGO	1.7	2.2	2.2	3.7	6.3	6.8	5.8	6.2	5.7	5.0	3.6	[illegible]	[illegible]
SUCRE	8.5	8.6	7.2	5.5	4.4	4.1	4.0	3.3	5.2	7.2	7.7	8.0	6.1
TUCUMAN	5.9	5.9	6.0	5.9	5.0	4.4	4.0	3.2	4.0	5.3	5.4	5.5	5.0
USHUAIA	6.9	6.6	6.3	5.9	6.4	5.8	5.9	5.6	5.9	6.5	6.6	7.1	6.3
YUMA	2.3	2.4	2.1	1.5	1.1	0.6	1.6	1.8	1.1	1.2	1.6	2.4	1.6

TABLE IX: MEAN WINDSPEED (MPH)

STATIONS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YR
AMBATO	2.7	2.2	2.5	2.2	2.2	2.2	2.9	2.9	2.7	2.7	2.7	2.9	2.6
ANDAGOYA	---	---	---	---	---	---	---	---	---	---	---	---	---
BELEM	---	---	---	---	---	---	---	---	---	---	---	---	---
BUENOS AIRES	10.0	10.5	8.9	9.9	8.3	8.8	9.8	10.0	10.9	10.1	10.2	10.1	9.8
CARACAS	6.9	8.0	8.8	7.9	7.8	8.5	7.8	6.5	6.2	6.2	6.3	6.7	7.3
COL. SARMIENTO	---	---	---	---	---	---	---	---	---	---	---	---	---
CUYABA	4.7	3.6	3.3	2.9	2.9	2.9	2.9	3.3	2.9	3.6	3.3	3.6	3.3
CUZCO	---	---	---	---	---	---	---	---	---	---	---	---	---
DADANAWA	---	---	---	---	---	---	---	---	---	---	---	---	---
GEORGETOWN	8.2	8.5	8.9	8.6	7.3	6.2	5.5	5.6	6.5	6.6	6.5	7.2	7.1
IQUIQUE	1.2	1.2	1.2	1.2	1.2	1.4	1.4	1.4	1.5	1.4	1.4	1.2	1.4
LIMA	4.5	4.5	3.6	3.1	2.9	3.4	3.6	4.3	5.7	5.4	5.1	5.4	4.3
MANAOS	3.8	4.3	3.8	3.8	3.4	4.0	3.8	4.3	4.5	4.3	4.3	3.8	4.0
MERIDA	---	---	---	---	---	---	---	---	---	---	---	---	---
MORRO DO CHAPEU	4.7	4.4	4.0	4.4	5.5	6.8	6.8	6.8	6.0	3.3	3.6	4.7	5.1
NATAL	13.2	10.6	10.1	10.1	10.6	12.1	11.6	14.2	15.9	15.9	14.8	14.8	12.6
PORTO VELHO	---	---	---	---	---	---	---	---	---	---	---	---	---
POSADAS	---	---	---	---	---	---	---	---	---	---	---	---	---
PUCALLPA	---	---	---	---	---	---	---	---	---	---	---	---	---
RIO DE JANEIRO	7.2	7.4	7.4	6.5	6.0	5.6	5.8	6.5	7.6	8.5	8.9	8.9	7.2
SANTIAGO	1.4	1.2	1.0	0.8	0.7	0.6	0.6	0.7	0.9	1.1	1.2	1.4	0.9
SUCRE	5.1	5.4	5.8	5.3	5.2	4.7	4.9	5.5	6.7	6.9	6.5	6.0	5.7
TUCUMAN	2.7	2.2	2.1	1.4	1.4	1.4	1.6	1.8	2.4	2.4	2.2	2.4	2.0
USHUAIA	8.6	8.5	7.3	6.6	7.2	6.3	8.4	7.0	9.9	9.7	9.3	7.9	8.1
YUMA	6.0	6.0	7.0	7.0	6.0	6.0	6.0	6.0	5.0	5.0	5.0	5.0	5.8

TABLE X: MEAN DEWPOINT TEMPERATURE (°F)*

STATIONS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YR
AMBATO	50	50	50	50	49	49	46	46	48	50	49	50	49
ANDAGOYA	--	--	--	--	--	--	--	--	--	--	--	--	--
BELEM	77	77	77	77	77	75	76	76	75	75	75	77	76
BUENOS AIRES	63	64	61	55	50	46	45	44	48	52	57	61	54
CARACAS	57	58	58	60	62	62	62	62	62	62	61	59	60
COL. SARMIENTO	45	45	43	39	34	30	29	31	33	37	39	42	37
CUYABA	73	72	72	71	67	63	59	60	63	69	72	72	68
CUZCO	46	47	46	45	42	36	33	42	43	44	47	47	43
DADANAWA	--	--	--	--	--	--	--	--	--	--	--	--	--
GEORGETOWN	72	72	72	72	74	74	74	75	74	74	74	74	73
IQUIQUE	63	62	61	59	56	55	52	53	55	57	60	61	58
LIMA	66	66	67	64	59	59	57	56	56	57	61	62	61
MANAOS	72	74	73	73	74	73	72	72	73	73	73	73	73
MERIDA	57	58	59	61	62	62	61	61	61	61	60	59	60
MORRO DO CHAPEU	62	62	62	62	60	59	58	56	57	59	61	60	59
NATAL	74	73	73	72	72	71	69	69	70	72	72	72	71
PORTO VELHO	--	--	--	--	--	--	--	--	--	--	--	--	--
POSADAS	70	70	68	63	58	55	53	53	58	60	63	56	60
PUCALLPA	--	--	--	--	--	--	--	--	--	--	--	--	--
RIO DE JANEIRO	71	72	70	68	65	62	61	61	63	65	67	69	66
SANTIAGO	52	53	52	49	45	42	41	42	45	47	47	49	47
SUCRE	46	45	46	44	35	31	32	36	41	42	44	45	4[illegible]
TUCUMAN	66	65	64	59	53	45	44	43	50	57	60	61	59
USHUAIA	41	39	38	33	31	28	30	31	33	37	38	43	35
YUMA	32	33	35	37	42	47	59	64	57	47	36	34	44

*FIGURES FOR ALL STATIONS EXCEPT YUMA ARE APPROXIMATE, BASED UPON RELATIONS BETWEEN MEAN MONTHLY TEMPERATURES AND RELATIVE HUMIDITIES.

A-10

Southern Africa

TABLE I: STATIONS USED IN TABLES OF MONTHLY VALUES

Stations	Elevation in Feet	Latitude	Longitude	Period of Record (Yrs) Temp	Prec	Other
Angola						
Coemba	4,265	12° 06' S	17° 42' E	10-14	14	
Mossamedes	10	15° 12' S	12° 09' E	15-20	21	
Bechuanaland						
Ghanzi	3,711	21° 30' S	21° 45' E	20-29	17-24	
Kasane	2,999	17° 49' S	25° 09' E	16-26	16-28	
Tsabong	3,156	26° 03' S	22° 27' E	10	14-17	
Republic of Congo						
Elizabethville*	4,035	11° 39' S	27° 28' E	13-18	10-17	
Mozambique						
Lourenco Marques	194	25° 58' S	32° 36' E	42	42	
Mossuril	49	14° 57' S	40° 40' E	26-27	26-27	
Tete	456	16° 11' S	33° 35' E	12-13	7-13	
Vila Cabral	4,478	13° 18' S	35° 14' E	13	6-13	
Zumbo	1,125	15° 37' S	30° 27' E	15	7-15	
N. Rhodesia						
Mongu	3,459	15° 17' S	23° 05' E	10	9-10	
S. Rhodesia						
Bulawayo	4,405	20° 09' S	28° 37' E	15-20	7-50	
SW Africa						
Ondangua	3,593	17° 56' S	15° 59' E	7	7-44	
Tsumeb	4,301	19° 14' S	17° 43' E	35-37	37-40	
Walvis Bay	24	22° 56' S	14° 30' E	20-24	9-20	
U. of S. Africa						
C. Agulhas	62	34° 50' S	20° 01' E	20-30	19-69	
Cradock	2,861	32° 10' S	25° 37' E	19-29	19-72	
Fraserburg	4,150	31° 55' S	21° 31' E	8- 9	3-58	
Kimberley	3,927	28° 48' S	24° 46' E	19	19-57	
Pietersburg	4,209	23° 56' S	29° 29' E	19	18-47	
Port Nolloth	23	29° 14' S	16° 52' E	20-30	19-64	
Port St. Johns	154	31° 38' S	29° 33' E	20-30	19-61	
YUMA, ARIZONA	206	32° 40' N	114° 36' W	80	84	44

TABLE II: MEAN MONTHLY TEMPERATURE °F.

STATIONS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YR.
ANGOLA													
COEMBA	71	70	70	68	64	60	58	62	66	70	70	70	66
MOSSAMEDES	72	75	76	74	72	68	62	64	65	68	70	76	64
BECHUANALAND													
GHANZI	78	76	74	67	60	54	55	60	66	73	75	76	68
KASANE	78	78	75	73	68	62	62	67	74	79	81	79	73
TSABONG	79	76	73	63	58	51	52	56	61	69	74	75	65
REPUBLIC OF CONGO,													
ELIZABETHVILLE	72	72	72	68	66	62	62	64	70	74	76	74	69
MOZAMBIQUE													
LOURENCO MARQUES	82	81	79	76	72	68	70	72	76	78	80	82	76
MOSSURIL	84	83	83	80	76	72	72	73	76	78	82	84	79
TETE	84	84	81	81	78	74	72	76	81	86	86	85	81
VILA CABRAL	70	70	68	68	66	62	62	64	66	71	72	71	68
ZUMBO	84	82	81	79	74	69	68	72	80	87	88	85	79
N. RHODESIA													
MONGU	76	76	74	73	67	62	64	70	74	80	78	76	72
S. RHODESIA													
BULAWAYO	72	71	69	68	62	58	58	62	67	74	74	73	67
SW AFRICA													
ONDANGUA	78	77	74	74	65	62	59	64	70	75	78	78	71
TSUMEB	78	76	74	70	64	60	60	64	72	78	78	78	71
WALVIS BAY	68	70	70	70	70	66	63	63	62	60	65	67	66
U. OF S. AFRICA													
C. AGULHAS	66	68	66	64	62	62	58	60	58	60	62	65	63
CRADOCK	74	73	69	64	56	49	50	55	60	64	69	72	63
FRASERBURG	72	72	68	58	50	45	43	46	52	59	64	69	58
KIMBERLEY	76	74	70	62	55	50	50	54	60	66	70	74	63
PIETERSBURG	72	70	68	63	57	52	52	56	62	68	70	70	63
PORT NOLLOTH	62	61	65	64	65	62	60	62	64	62	66	61	63
PORT ST. JOHNS	72	72	72	71	70	67	66	68	69	68	69	70	70
YUMA, ARIZONA	55	59	64	70	77	85	91	90	85	73	62	55	72

TABLE III: MEAN DAILY MAXIMUM TEMPERATURE °F.

STATIONS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YR.
ANGOLA													
COEMBA	80	78	81	83	85	83	82	85	87	84	80	79	82
MOSSAMEDES	79	83	84	82	77	72	68	70	72	74	78	79	77
BECHUANALAND													
GHANZI	90	89	86	84	79	74	75	80	87	92	92	91	85
KASANE	87	87	87	87	83	79	80	84	92	95	93	88	87
TSABONG	94	92	88	83	76	71	71	77	83	88	92	94	84
REPUBLIC OF CONGO													
ELIZABETHVILLE	82	82	82	82	81	79	79	83	89	91	87	82	83
MOZAMBIQUE													
LOURENCO MARQUES	86	87	85	83	80	77	76	78	80	82	83	85	82
MOSSURIL	90	90	89	88	85	82	81	82	85	88	91	91	87
TETE	95	94	91	93	91	86	84	88	95	101	99	98	93
VILA CABRAL	78	78	77	77	76	72	72	74	79	83	82	79	77
ZUMBO	90	90	91	91	89	83	83	87	94	100	98	94	91
N. RHODESIA													
MONGU	83	83	83	84	82	78	80	85	92	93	88	83	85
S. RHODESIA													
BULAWAYO	81	80	79	79	74	69	70	74	81	85	84	82	78
SW AFRICA													
ONDANGUA	90	88	87	88	84	79	80	85	91	94	92	90	87
TSUMEB	88	86	85	83	80	76	76	81	89	92	90	89	85
WALVIS BAY	73	74	74	75	74	74	70	68	66	67	71	72	72
U. OF S. AFRICA													
C. AGULHAS	74	74	72	69	66	63	61	63	63	66	69	72	68
CRADOCK	87	85	82	77	70	66	64	69	73	78	81	85	77
FRASERBURG	87	86	82	71	63	58	59	61	67	74	80	84	73
KIMBERLEY	91	88	83	77	70	65	65	71	76	83	86	89	79
PIETERSBURG	81	80	78	76	71	67	67	71	76	79	80	81	76
PORT NOLLOTH	67	67	67	66	66	65	62	63	63	64	66	66	65
PORT ST. JOHNS	77	78	77	75	74	72	71	70	71	72	73	76	74
YUMA, ARIZONA	67	72	78	86	93	102	106	104	100	88	76	68	87

TABLE IV: MEAN DAILY MINIMUM TEMPERATURE °F.

Stations	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr.
Angola													
Coemba	61	60	60	58	48	38	37	44	54	60	60	61	53
Mossamedes	65	68	69	66	59	57	56	57	59	61	63	64	62
Bechuanaland													
Ghanzi	64	63	60	54	45	39	38	44	50	59	62	63	54
Kasane	65	65	64	61	54	48	47	51	59	65	67	65	59
Tsabong	65	65	60	51	41	34	34	39	45	54	59	63	51
Republic of Congo													
Elizabethville	61	62	61	57	50	44	43	46	52	58	61	62	55
Mozambique													
Lourenco Marques	71	71	69	66	60	56	55	57	61	64	67	69	64
Mossuril	74	74	74	72	68	65	63	63	65	69	73	75	70
Tete	69	71	69	68	63	59	57	60	64	69	71	70	66
Vila Cabral	60	61	60	58	54	50	50	51	54	59	60	60	56
Zumbo	71	71	70	67	59	55	55	58	66	73	73	72	66
N. Rhodesia													
Mongu	66	66	66	62	56	50	49	55	62	65	65	65	61
S. Rhodesia													
Bulawayo	61	61	59	56	49	45	45	48	54	59	61	61	55
SW Africa													
Ondangua	67	66	65	62	55	45	43	47	55	61	64	66	58
Tsumeb	66	65	63	59	52	47	47	51	60	66	66	66	59
Walvis Bay	59	60	59	55	52	48	47	46	48	51	54	57	53
U. of S. Africa													
C. Agulhas	63	63	61	58	55	52	50	51	52	55	59	61	57
Cradock	58	58	55	49	41	35	34	38	43	48	53	55	47
Fraserburg	57	57	53	45	38	33	28	31	37	44	49	54	44
Kimberley	64	63	59	52	43	37	36	41	47	54	58	61	51
Pietersburg	60	59	57	51	42	36	37	41	47	54	57	60	50
Port Nolloth	53	54	53	50	48	46	45	45	47	49	51	53	49
Port St. Johns	67	68	67	64	61	57	56	57	59	61	63	65	62
Yuma, Arizona	42	46	50	54	60	68	77	77	70	58	48	44	58

TABLE V: ABSOLUTE MAXIMUM TEMPERATURE °F.

STATIONS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YR.
ANGOLA													
COEMBA	95	90	91	92	93	93	93	93	95	97	95	93	97
MOSSAMEDES	91	94	96	102	100	101	85	83	82	88	90	92	102
BECHUANALAND													
GHANZI	107	111	106	98	91	90	88	100	104	104	108	108	111
KASANE	100	99	98	99	98	89	91	96	103	108	105	105	108
TSABONG	107	103	100	96	88	86	84	89	98	100	106	106	107
REPUBLIC OF CONGO													
ELIZABETHVILLE	91	90	93	90	89	86	89	94	99	98	97	93	99
MOZAMBIQUE													
LOURENCO MARQUES	110	103	104	102	101	94	96	100	114	113	112	112	114
MOSSURIL	100	98	96	94	95	89	88	91	93	97	100	101	101
TETE	110	109	109	110	104	102	97	104	111	113	115	111	115
VILA CABRAL	90	86	86	93	93	88	88	100	95	97	99	90	100
ZUMBO	107	104	104	106	101	96	95	102	110	111	120	110	120
N. RHODESIA													
MONGU	93	92	90	91	91	89	90	98	101	103	99	99	103
S. RHODESIA													
BULAWAYO	96	94	93	91	87	82	83	89	96	97	99	95	99
SW AFRICA													
ONDANGUA	101	99	99	98	96	86	86	93	99	100	102	101	102
TSUMEB	103	100	100	96	94	90	87	92	100	102	103	103	103
WALVIS BAY	100	97	97	103	104	97	98	99	100	97	95	91	104
U. OF S. AFRICA													
C. AGULHAS	84	97	95	96	93	86	85	89	90	79	87	87	97
CRADOCK	107	105	103	98	91	81	83	89	98	103	106	107	107
FRASERBURG	104	101	100	96	90	82	83	93	101	96	100	99	104
KIMBERLEY	103	101	96	93	86	82	79	86	93	99	99	103	103
PIETERSBURG	96	94	93	88	84	79	82	85	92	97	99	96	99
PORT NOLLOTH	102	107	103	104	99	92	92	100	105	104	105	103	107
PORT ST. JOHNS	89	91	92	94	94	91	93	97	103	106	100	90	106
YUMA, ARIZONA	84	92	100	107	120	119	120	119	123	108	96	83	123

TABLE VI: ABSOLUTE MINIMUM TEMPERATURE °F.

Stations	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr.
Angola													
Coemba	48	54	46	45	32	30	25	30	34	38	43	50	25
Mossamedes	57	58	54	53	51	47	44	47	48	54	52	54	44
Bechuanaland													
Ghanzi	45	44	41	31	21	20	16	24	29	34	42	45	16
Kasane	55	52	50	44	37	31	32	35	39	48	49	52	31
Tsabong	44	47	47	24	20	16	15	18	21	27	39	42	15
Republic of Congo													
Elizabethville	50	54	46	41	38	34	33	33	37	45	50	54	33
Mozambique													
Lourenco Marques	61	62	60	52	46	46	45	47	49	53	52	59	45
Mossuril	67	66	68	63	56	53	55	55	58	60	62	68	53
Tete	45	46	48	52	50	45	46	49	50	50	50	52	45
Vila Cabral	50	53	50	49	48	42	42	40	41	50	52	50	40
Zumbo	63	62	54	52	44	42	38	47	51	62	63	54	38
N. Rhodesia													
Mongu	61	62	59	52	42	32	37	42	45	57	52	56	32
S. Rhodesia													
Bulawayo	49	46	48	38	33	28	32	32	37	44	49	51	28
SW Africa													
Ondangua	54	53	45	47	32	30	30	31	39	47	52	54	30
Tsumeb	49	50	44	44	34	27	25	35	37	46	53	46	25
Walvis Bay	45	45	45	43	35	35	25	34	32	32	43	45	25
U. of S. Africa													
C. Agulhas	47	48	49	41	40	42	39	40	40	41	41	41	39
Cradock	40	40	38	30	25	19	20	23	24	31	34	39	19
Fraserburg	39	42	38	30	22	20	16	15	21	23	33	35	15
Kimberley	44	43	40	30	23	22	20	21	25	31	36	43	20
Pietersburg	45	40	41	32	27	21	21	28	28	39	40	46	21
Port Nolloth	43	42	40	36	35	33	32	31	34	36	41	40	31
Port St. Johns	54	52	52	52	48	42	44	43	44	46	45	53	42
YUMA, ARIZONA	22	25	31	38	39	50	61	58	50	38	29	22	22

TABLE VII: MEAN MONTHLY PRECIPITATION (IN INCHES)

STATIONS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YR.
ANGOLA													
COEMBA	9.4	7.9	8.3	4.3	0.3	0.0	0.0	0.1	1.0	4.1	6.6	8.7	50.7
MOSSAMEDES	0.3	0.4	0.7	0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	2.1
BECHUANALAND													
GHANZI	4.1	3.6	3.6	1.5	0.3	<0.1	<0.1	<0.1	0.1	0.9	1.7	2.6	18.4
KASANE	6.5	6.1	4.0	1.1	0.3	<0.1	0.0	<0.1	0.1	0.7	2.7	5.2	26.7
TSABONG	2.0	1.9	1.9	1.3	0.4	0.4	0.1	<0.1	0.2	0.7	1.1	1.5	11.5
REPUBLIC OF CONGO													
ELIZABETHVILLE	10.5	9.6	8.4	2.2	0.2	0.0	0.0	<0.1	0.1	1.2	5.9	10.6	48.7
MOZAMBIQUE													
LOURENCO MARQUES	5.1	4.9	4.9	2.1	1.1	0.8	0.5	0.5	1.1	1.9	3.2	3.8	29.9
MOSSURIL	8.9	8.7	5.6	3.2	1.2	1.2	0.6	0.5	0.4	0.4	1.2	5.5	37.4
TETE	6.0	6.4	4.6	0.5	0.1	0.1	0.1	0.1	<0.1	0.3	1.1	3.9	23.2
VILA CABRAL	10.6	9.1	11.3	2.8	1.2	0.2	<0.1	0.1	0.1	0.5	3.2	8.1	47.2
ZUMBO	8.2	6.7	4.1	0.1	<0.1	<0.1	<0.1	0.1	<0.1	0.2	3.3	6.5	29.2
N. RHODESIA													
MONGU	8.7	7.7	6.2	1.5	<0.1	<0.1	0.0	<0.1	0.1	1.4	3.9	7.9	37.4
S. RHODESIA													
BULAWAYO	5.6	4.3	3.3	0.7	0.4	0.1	<0.1	<0.1	0.2	0.8	3.2	4.8	23.4
SW AFRICA													
ONDANGUA	4.3	4.8	3.7	1.4	0.1	0.0	<0.1	<0.1	0.1	0.5	1.8	3.6	20.3
TSUMEB	4.6	4.7	3.2	1.5	0.2	<0.1	<0.1	<0.1	<0.1	0.7	2.2	3.5	20.5
WALVIS BAY	<0.1	0.2	0.3	0.1	0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	[illegible]
U. OF S. AFRICA													
C. AGULHAS	0.8	0.7	1.3	1.5	2.0	2.3	2.1	1.9	1.6	1.5	1.1	0.7	17.5
CRADOCK	1.7	2.1	2.2	1.2	0.8	0.4	0.3	0.3	0.7	1.0	1.2	1.3	13.2
FRASERBURG	0.7	1.0	1.1	0.8	0.6	0.4	0.3	0.3	0.3	0.3	0.4	0.4	6.6
KIMBERLEY	2.4	2.5	3.1	1.5	0.7	0.2	0.2	0.3	0.6	1.0	1.6	2.0	[illegible]
PIETERSBURG	3.9	3.0	2.7	1.1	0.4	0.1	0.2	0.2	0.4	1.7	3.1	3.6	[illegible]
PORT NOLLOTH	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.3	0.2	0.1	0.1	0.1	[illegible]
PORT ST. JOHNS	4.8	5.5	6.1	3.4	2.6	1.5	1.5	2.0	3.6	5.2	4.8	5.2	[illegible]
YUMA, ARIZONA	0.4	0.4	0.3	0.1	<0.1	<0.1	0.2	0.6	0.4	0.3	0.2	0.5	3.[illegible]

TABLE VIII: MEAN CLOUDINESS (IN TENTHS OF SKY COVERAGE)

STATIONS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YR.
ANGOLA													
MOSSAMEDES	6.4	5.6	5.7	5.2	3.2	6.1	7.6	7.0	7.5	6.8	5.8	6.2	6.1
BECHUANALAND													
GHANZI*	4.4	3.9	4.4	2.9	1.3	1.8	0.5	0.5	1.7	3.5	4.6	4.9	2.9
KASANE*	5.2	4.0	3.6	1.9	1.2	1.0	1.2	0.2	0.4	2.2	3.6	4.9	2.4
MOZAMBIQUE													
LOURENCO MARQUES	6.1*	5.6	5.6	4.0	3.2	2.2	2.6	2.6	4.0	5.5	6.4	6.3	4.5
MOSSURIL	7.3	7.7	6.4	5.6	4.1	4.2	4.1	4.1	3.4	3.2	4.1	6.3	5.0
S. RHODESIA													
BULAWAYO*	6.4	6.6	6.0	3.0	3.6	2.2	2.2	1.8	1.8	2.9	5.5	6.1	4.0
SW AFRICA													
WALVIS BAY	8	8	7	8	4	3	4	4	7	8	8	8	6.4
U. OF S. AFRICA													
C. AGULHAS	5	6	7	5	5	5	5	5	6	6	6	6	6
PORT NOLLOTH	6	5	5	5	5	4	4	4	5	5	6	5	5

*AVERAGE OF MORNING OBSERVATIONS ONLY.

TABLE IX: MEAN RELATIVE HUMIDITY, MORNING OBSERVATION

Stations	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr.
Angola													
Coemba	85	85	85	81	76	77	70	70	66	73	82	85	78
Mossamedes	80	79	78	80	81	85	85	86	83	82	79	79	81
Bechuanaland													
Ghanzi	66	70	73	70	66	65	60	51	47	49	54	61	61
Kasane	73	76	71	67	59	60	59	49	44	44	58	70	61
Tsabong	63	70	79	78	82	81	73	68	57	53	54	51	67
Republic of Congo													
Elizabethville	87	91	87	85	83	84	81	70	57	54	77	88	79
Mozambique													
Lourenco Marques	72	73	75	72	71	70	71	68	65	65	67	69	70
Mossuril	72	74	76	75	73	74	73	70	66	61	60	65	70
Tete	70	73	72	71	72	71	69	68	63	60	64	68	69
Vila Cabral	83	83	83	81	75	71	69	69	60	55	65	78	73
Zumbo	79	78	76	69	65	65	64	60	53	48	57	71	65
N. Rhodesia													
Mongu	84	84	79	68	59	59	50	41	36	47	69	79	63
S. Rhodesia													
Bulawayo	70	74	72	63	56	56	52	46	42	41	53	62	57
SW Africa													
Ondangua	68	78	76	70	62	58	59	46	43	39	50	65	60
Tsumeb	64	68	71	63	51	48	45	35	26	33	46	57	51
Walvis Bay	91	92	95	89	88	78	83	89	90	91	90	90	89
U. of S. Africa													
C. Agulhas	83	86	91	90	88	88	89	90	88	84	84	83	87
Cradock	68	75	77	81	79	76	73	71	68	66	66	67	72
Kimberley	55	62	69	69	70	71	66	55	48	48	48	50	59
Pietersburg	74	76	79	77	77	76	75	70	65	62	67	71	72
Port Nolloth	91	93	91	88	85	82	86	85	86	88	87	89	88
Port St. Johns	84	83	85	78	69	65	62	75	77	79	81	82	77
Yuma, Arizona	57	59	57	55	55	55	60	66	64	58	55	57	58

*Station reporting times vary from 0530 LST at Yuma, Arizona to 0930 LST at Vila Cabral, Mozambique.

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Australia

Table I
Stations Used in Tables of Monthly Values

Station	Elevation (feet)	Latitude (South)	Longitude (East)	Years of Record Temp.	Prec.	Other
Adelaide South Australia	140	34°56'	138°35'	86	104	30-92
Boulia Queensland	478	22°55'	139°47'	28	51	17-30
Broome Western Australia	63	17°57'	122°15'	25	32	10-24
Burketown Queensland	30	17°45'	139°33'	31	53	28-30
Cape Leeuwin Western Australia	163	34°22'	115°08'	44	46	30-39
Carnarvon Western Australia	15	24°54'	113°39'	43	57	30-45
Charleville Queensland	965	26°25'	146°13'	33	65	5-29
Charlotte Waters Northern Territory	645	25°56'	134°55'	38	57	45-51
Condon Western Australia	35	20°00'	119°20'	28	37	10-28
Dubbo New South Wales	870	32°15'	140°37'	72	72	30-76
Esperance Western Australia	14	33°50'	121°55'	44	60	23-47
Eucla Western Australia	15	31°45'	128°28'	60	64	10-60
Farina South Australia	303	30°05'	138°08'	42	30	30-53
Halls Creek Western Australia	1,200	18°13'	127°46'	33	30	14-55
Katherine Northern Territory	355	14°18'	132°18'	10	30	8-16
Laverton Western Australia	1,510	28°40'	122°23'	20	30	17-39
Melbourne Victoria	115	37°49'	144°58'	88	88	30-89
Mundiwindi Western Australia	1,840	23°52'	120°10'	15	15	15-38
Tennant Creek Northern Territory	1,075	19°34'	150°40'	27	32	5-28
Toowoomba Queensland	1,921	27°33'	151°57'	31	66	4-71
Townsville Queensland	48	19°14'	146°51'	31	67	10-22
Warburton Ranges Western Australia	1,200	26°05'	126°36'	6	9	2-13
Wilcannia New South Wales	267	31°33'	143°23'	60	66	34-39
Yelgoo Western Australia	1,044	28°23'	116°43'	34	30	19-58
YUMA	206	32°40'N	114°36'W	80	84	44

Table II

Mean Monthly Temperature (°F)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr
Adelaide	74	74	70	64	58	54	52	54	57	62	67	71	63
Boulia	88	88	84	75	67	61	60	64	71	78	84	67	76
Broome	86	86	85	83	77	71	70	73	77	82	85	86	80
Burketown	85	84	83	80	74	70	69	71	76	82	85	86	79
Cape Leeuwin	68	69	68	65	61	59	57	57	58	59	63	66	62
Carnarvon	80	80	80	75	68	64	61	63	66	65	73	77	71
Charleville	84	83	78	70	62	56	54	58	65	73	79	82	70
Charlotte Waters	86	85	79	70	61	56	54	59	66	74	80	84	71
Condon	86	86	84	79	72	66	64	67	72	77	82	85	77
Dubbo	79	78	73	64	56	50	48	51	57	64	71	76	64
Esperance	69	69	67	63	59	55	54	55	57	59	63	66	61
Eucla	70	71	70	66	61	56	55	56	59	63	66	69	64
Farina	82	82	76	67	57	53	51	55	61	69	76	80	68
Halls Creek	87	86	83	78	71	66	65	69	76	64	87	87	78
Katherine	85	84	83	80	76	71	71	74	82	87	88	87	80
Laverton	83	82	77	69	61	54	53	56	63	69	77	79	69
Melbourne	68	68	65	60	55	51	49	51	55	58	61	65	59
Mundiwindi	83	86	82	74	64	58	56	60	67	74	82	86	73
Tennant Creek	87	86	83	78	70	65	64	68	85	82	86	87	77
Toowoomba	72	71	69	63	57	52	51	54	59	64	68	71	62
Townsville	82	81	80	77	73	69	67	69	73	77	80	82	76
Warburton Ranges	84	83	79	71	62	56	56	59	65	71	77	83	71
Wilcannia	81	81	75	66	58	52	51	55	61	68	75	80	67
Yalgoo	84	83	78	71	62	56	59	56	61	67	75	81	69
YUMA	55	59	64	70	77	85	91	90	85	73	62	55	72

Table III

Mean Daily Maximum Temperature (°F)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr
Adelaide	86	86	81	73	66	61	59	62	66	73	79	83	73
Boulia	101	100	96	88	80	73	73	78	86	93	98	101	89
Broome	92	92	93	93	88	82	82	85	89	91	93	93	89
Burketown	93	92	92	91	86	82	82	84	89	93	95	95	90
Cape Leeuwin	73	74	73	70	66	63	61	61	62	64	68	71	67
Carnarvon	88	88	88	84	78	73	71	73	75	78	81	85	80
Charleville	97	96	91	84	76	69	68	73	80	88	93	96	84
Charlotte Waters	99	98	92	83	74	68	67	73	80	88	94	97	84
Condon	95	94	94	91	84	78	77	81	86	91	94	94	88
Dubbo	93	91	86	77	68	61	60	64	71	79	86	91	77
Esperance	77	78	76	72	68	63	62	63	66	68	72	75	70
Eucla	78	78	78	75	71	66	65	67	70	73	75	77	73
Farina	96	96	89	80	71	64	63	68	75	83	90	94	81
Halls Creek	98	97	95	92	85	81	81	86	93	98	100	99	92
Katherine	95	93	94	93	91	86	87	90	96	100	100	97	93
Laverton	96	95	89	81	72	65	64	68	76	82	90	95	81
Melbourne	78	78	75	68	62	57	56	59	63	67	71	75	67
Mundiwindi	101	99	94	87	77	71	70	75	83	89	97	100	87
Tennant Creek	98	96	94	89	81	77	76	81	89	95	98	99	89
Toowoomba	82	81	78	74	67	62	61	65	71	76	80	82	73
Townsville	87	87	86	84	81	77	75	77	80	83	85	87	82
Warburton Ranges	97	95	90	83	75	69	69	73	80	85	90	96	84
Wilcannia	95	95	88	79	70	63	62	67	74	82	89	94	80
Yalgoo	98	97	91	84	73	66	65	67	75	81	90	96	82
YUMA	67	72	78	86	93	102	106	104	100	88	76	68	87

Table IV

Mean Daily Minimum Temperature (°F)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr
Adelaide	61	62	59	55	50	47	45	46	48	51	55	59	53
Boulia	75	75	71	62	53	48	46	49	56	63	70	73	62
Broome	79	79	77	72	65	60	58	60	65	72	76	79	70
Burketown	77	76	74	69	62	58	55	58	63	70	74	77	68
Cape Leeuwin	62	63	62	60	56	54	52	52	53	54	57	60	57
Carnarvon	72	72	71	66	58	54	51	53	57	61	65	69	62
Charleville	71	70	65	56	47	42	40	42	49	58	64	68	56
Charlotte Waters	72	72	66	57	48	43	41	44	51	59	65	71	57
Condon	77	77	74	67	60	54	51	53	57	63	70	75	65
Dubbo	64	64	59	51	43	39	36	38	43	49	56	61	50
Esperance	60	60	58	54	50	47	45	46	48	50	54	57	52
Eucla	62	63	61	56	51	46	44	45	48	52	56	60	54
Farina	68	68	63	54	46	42	39	42	47	55	61	66	54
Halls Creek	75	74	71	64	56	51	48	52	59	69	74	75	64
Katherine	74	74	72	66	61	55	55	58	67	74	76	76	67
Laverton	69	68	64	57	49	43	41	44	49	55	63	63	56
Melbourne	57	57	55	51	47	44	42	43	46	48	51	59	50
Mundiwindi	64	73	69	61	51	44	41	45	51	58	67	71	59
Tennant Creek	76	75	72	67	59	53	51	54	61	68	73	75	65
Toowoomba	61	61	59	52	46	42	41	42	47	52	56	59	51
Townsville	76	75	73	70	65	61	59	61	66	71	74	76	69
Warburton Ranges	71	70	67	58	49	43	42	45	50	57	63	69	57
Wilcannia	67	66	61	52	46	41	39	42	47	54	60	65	53
Yalgoo	69	69	65	58	50	46	43	44	47	52	59	65	56
YUMA	42	46	50	54	60	68	77	77	70	58	48	44	58

Table V

Absolute Maximum Temperature (°F)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr
Adelaide	118	114	111	99	89	76	74	85	91	103	113	115	118
Boulia	118	119	116	104	101	93	93	99	107	112	116	118	119
Broome	106	108	105	107	101	97	94	99	104	109	111	109	111
Burketown	108	110	106	102	97	92	92	96	101	106	107	107	110
Cape Leeuwin	102	109	98	95	85	75	72	75	82	89	92	98	109
Carnarvon	116	114	113	106	100	90	87	90	97	105	109	112	116
Charleville	116	115	110	102	92	88.	87	94	102	110	117	118	118
Charlotte Waters	119	113	111	105	93	91	92	95	104	117	116	117	119
Condon	114	113	108	111	98	94	93	95	102	109	113	115	115
Dubbo	113	111	105	98	91	80	75	87	93	102	110	114	114
Esperance	117	111	111	102	92	81	79	89	96	104	106	109	117
Eucla	123	120	112	107	96	84	90	95	104	110	116	121	123
Farina	118	114	111	102	91	86	86	91	100	109	111	101	118
Halls Creek	112	111	107	104	99	95	93	100	104	109	111	112	112
Katherine	103	105	105	107	106	100	97	99	105	107	111	108	111
Laverton	115	114	112	103	95	83	86	92	98	105	111	114	115
Melbourne	114	110	107	95	84	72	69	77	89	98	106	111	114
Mundiwindi	112	112	108	104	98	86	87	93	97	105	108	111	112
Tennant Creek	115	111	107	104	100	91	92	96	102	108	112	113	113
Toowoomba	104	101	99	88	84	81	78	82	89	96	100	105	105
Townsville	104	110	95	97	90	87	85	89	94	94	101	101	110
Warburton Ranges	113	115	110	103	92	89	89	93	101	104	111	111	115
Wilcannia	122	115	112	101	92	86	89	90	98	106	113	116	122
Yalgoo	115	116	111	105	94	84	81	93	96	104	109	113	116
YUMA	84	92	100	107	120	119	120	119	123	108	96	83	123

Table VI

Absolute Minimum Temperature (°F)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr
Adelaide	45	45	44	40	37	33	32	32	33	36	41	43	32
Boulia	52	55	52	40	32	29	26	28	34	40	48	50	26
Broome	68	67	55	54	45	44	40	43	52	53	62	68	40
Burketown	68	61	60	50	42	42	40	43	48	53	61	59	40
Cape Leeuwin	50	50	51	45	41	42	40	42	39	43	44	51	39
Carnarvon	58	61	57	47	43	38	37	38	42	46	50	57	37
Charleville	53	50	41	38	28	23	23	24	29	35	40	48	23
Charlotte Waters	52	55	49	37	29	22	25	28	31	40	44	51	22
Condon	65	61	56	46	41	37	37	38	42	49	49	60	37
Dubbo	43	43	39	30	26	22	20	23	27	28	35	38	20
Esperance	41	41	41	38	35	32	31	32	34	34	38	40	31
Eucla	45	44	40	40	33	28	28	29	31	32	37	38	28
Farina	51	51	47	39	29	27	25	28	33	37	42	47	25
Halls Creek	60	54	52	45	36	32	30	33	37	48	53	54	30
Katherine	66	57	55	51	46	40	39	41	47	52	61	63	39
Laverton	51	50	43	37	30	27	25	27	30	38	40	50	25
Melbourne	42	40	37	35	30	28	27	28	31	32	37	40	27
Mundiwindi	59	55	49	41	29	26	22	26	29	38	46	53	22
Tennant Creek	60	52	54	50	41	37	36	37	42	51	52	58	36
Toowoomba	45	46	33	31	31	22	23	25	30	34	39	43	22
Townsville	66	65	61	54	48	41	42	45	52	53	63	65	41
Warburton Ranges	50	54	52	41	31	27	24	29	34	39	45	49	24
Wilcannia	50	50	44	35	28	27	26	28	32	35	42	46	26
Yalgoo	50	51	48	40	33	30	29	31	34	30	43	49	29
YUMA	22	25	31	38	39	50	61	58	50	38	29	22	22

Table VII

Average Precipitation (inches)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr
Adelaide	0.8	0.7	1.0	1.8	2.7	3.0	2.6	2.6	2.1	1.7	1.1	1.0	21.1
Boulia	1.6	1.9	1.5	0.6	0.4	0.5	0.3	0.3	0.3	0.5	1.0	1.4	10.3
Broome	6.3	5.8	3.9	1.2	0.6	0.9	0.2	0.1	T	T	0.6	3.3	22.9
Burketown	8.2	6.3	5.2	1.0	0.2	0.3	T	T	T	0.4	1.5	4.4	27.5
Cape Leeuwin	0.6	0.7	1.2	2.3	5.9	7.3	7.3	5.4	3.4	2.8	1.2	0.8	38.9
Carnarvon	0.4	0.7	0.7	0.6	1.5	2.4	1.6	0.7	0.2	0.1	T	0.2	9.1
Charleville	2.5	2.6	2.3	1.3	1.2	1.3	1.2	0.7	0.8	1.2	1.7	2.4	19.2
Charlotte Waters	0.8	0.6	0.6	0.5	0.4	0.4	0.2	0.2	0.2	0.3	0.5	0.6	5.3
Condon	2.2	2.5	3.0	1.1	0.7	1.1	0.3	0.2	T	T	0.1	0.7	11.9
Dubbo	2.1	1.7	1.9	1.8	1.7	2.0	1.7	1.7	1.6	1.6	2.0	2.0	21.8
Esperance	0.7	0.7	1.2	1.8	3.3	4.1	4.0	3.8	2.7	2.2	1.0	0.9	26.4
Eucla	0.6	0.7	0.9	1.0	1.2	1.1	0.9	0.9	0.7	0.7	0.7	0.5	9.9
Farina	0.5	0.6	0.5	0.4	0.6	0.6	0.3	0.3	0.3	0.5	0.5	0.5	5.6
Halls Creek	5.4	4.2	2.8	0.5	0.2	0.2	0.2	0.1	0.1	0.5	1.4	3.1	18.7
Katherine	9.1	7.1	5.9	0.8	0.3	0.1	T	T	0.2	1.1	3.0	7.8	35.4
Laverton	0.8	0.8	1.6	0.8	0.9	0.7	0.6	0.5	0.2	0.3	0.8	0.8	8.6
Melbourne	1.9	1.8	2.2	2.3	2.1	2.1	1.9	1.9	2.3	2.6	2.3	2.3	25.7
Mundiwindi	1.0	1.9	2.0	0.8	0.6	0.9	0.1	0.3	0.3	0.5	0.5	1.2	10.1
Tennant Creek	3.6	3.6	2.0	0.6	0.3	0.2	0.2	0.1	0.3	0.5	1.0	2.1	14.5
Toowoomba	5.0	4.5	3.7	2.6	2.1	2.4	2.1	1.6	2.1	2.6	3.3	4.5	36.5
Townsville	10.9	11.2	7.2	3.3	1.3	1.4	0.6	0.5	0.7	1.3	1.9	5.4	45.7
Warburton Range	1.0	1.2	1.8	1.3	1.0	0.7	0.3	0.4	0.1	0.6	1.0	1.2	10.6
Wilcannia	0.9	0.9	0.8	0.7	1.0	0.9	0.6	0.7	0.6	0.9	0.7	1.0	9.[illegible]
Yalgoo	0.7	0.9	1.3	0.6	1.1	1.8	1.3	1.0	0.4	0.3	0.4	0.4	10.2
YUMA	0.4	0.4	0.3	0.1	T	T	0.2	0.6	0.4	0.3	0.2	0.5	3.4

T = trace

Table VIII

Mean Relative Humidity (percent)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr
Adelaide	38	43	46	55	67	76	76	69	60	51	43	39	53
Boulia	35	39	40	37	43	51	48	39	30	26	28	31	37
Broome	71	72	65	52	49	52	49	49	50	55	61	67	58
Burketown	66	68	63	47	42	45	41	37	38	42	47	60	49
Cape Leeuwin	79	79	80	82	83	84	83	83	83	80	79	78	81
Carnarvon	57	60	58	57	60	66	66	62	57	55	56	57	59
Charleville	44	48	50	50	57	68	64	51	43	39	39	42	50
Charlotte Waters	28	30	33	40	46	55	50	41	33	26	26	27	36
Condon	58	62	55	47	47	52	53	49	45	45	47	56	51
Dubbo	49	53	59	67	77	85	84	78	66	53	48	47	63
Esperance	62	63	66	70	75	78	78	74	69	65	62	61	69
Eucla	59	61	60	61	65	71	70	63	56	53	55	56	61
Farina	32	35	39	48	58	70	67	56	45	36	32	32	46
Halls Creek	51	52	46	35	37	40	37	33	29	32	35	43	39
Katherine	82	86	82	63	60	58	57	54	54	58	65	71	66
Laverton	36	37	44	47	54	61	60	52	41	37	35	34	45
Melbourne	58	62	64	72	79	83	82	76	68	61	60	59	69
Mundiwindi	29	31	35	34	42	49	45	38	26	22	20	24	33
Tennant Creek	42	47	41	33	37	42	38	31	29	28	32	37	36
Toowoomba	74	76	77	74	75	78	76	70	67	65	67	69	72
Townsville	73	73	71	66	65	66	64	63	63	69	65	70	67
Warburton Range	25	31	32	32	44	52	46	36	27	31	27	28	34
Wilcannia	38	42	47	56	67	78	75	64	51	43	39	39	53
Yalgoo	40	44	51	56	66	76	77	71	58	49	42	39	56
YUMA	46	34	31	30	27	24	36	38	31	28	31	35	32

Table IX

Average Cloudiness (tenths of sky covered)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr
delaide	3.6	3.7	4.0	5.2	5.8	6.1	6.0	5.5	5.3	5.3	4.9	4.2	5.0
oulia	4.5	2.5	2.5	3.0	3.0	1.5	2.0	1.0	1.0	1.5	2.0	2.8	2.2
roome	4.7	5.0	3.5	2.3	1.9	1.9	1.3	1.0	0.9	1.2	2.1	3.9	2.5
rketown	5.6	5.1	3.9	2.8	2.6	2.5	1.7	1.5	1.7	2.5	3.3	4.7	3.2
pe Leeuwin	5.6	5.7	6.0	6.4	7.2	7.4	7.4	7.2	7.2	7.0	6.5	6.1	6.6
rnarvon	1.9	2.5	2.3	2.4	3.1	3.3	2.8	2.2	1.8	1.9	1.5	1.7	2.3
arleville	3.7	4.3	3.4	3.0	2.6	3.0	2.6	1.7	1.7	2.9	2.6	2.9	2.9
arlotte Waters	2.9	3.0	-	-	-	-	-	-	-	-	-	2.8	-
ndon	3.1	-	-	-	4.7	-	-	-	-	-	-	-	-
bbo	2.5	3.0	3.5	-	4.5	4.5	-	4.5	3.5	-	4.0	3.5	-
perance	4.1	4.6	4.8	5.0	5.4	5.5	5.0	4.9	4.5	4.8	4.3	4.1	4.7
cla	4.9	4.9	5.3	5.1	5.1	5.0	4.5	4.1	3.8	4.5	4.9	5.0	4.8
rina	-	2.5	-	-	4.0	-	-	-	-	-	-	2.7	-
lls Creek	5.0	5.6	3.7	3.4	2.7	2.2	1.9	1.6	1.7	2.6	3.6	5.4	3.3
therine	-	-	3.5	-	-	1.0	-	-	-	-	4.0	-	-
verton	-	2.0	-	-	1.0	2.0	1.0	-	-	-	-	-	-
lbourne	4.9	4.8	5.3	5.9	6.1	6.5	6.3	6.0	5.9	6.1	6.0	5.6	5.8
ndiwindi	-	2.0	2.5	-	3.5	2.0	3.5	-	-	1.0	2.5	-	-
nnant Creek	-	-	4.0	-	-	1.0	2.0	1.0	1.0	2.0	3.5	3.5	-
owoomba	5.0	5.5	5.0	5.5	3.5	5.5	2.0	3.0	3.5	2.5	5.0	5.0	4.2
wnsville	5.8	6.0	5.6	4.8	4.4	5.0	3.7	3.8	4.3	4.5	4.9	5.7	4.9
rburton Range	2.9	2.1	2.6	3.4	3.9	3.4	3.5	2.6	2.1	2.3	2.4	2.0	2.7
lcannia	2.0	1.0	2.0	-	2.5	-	3.5	-	2.5	4.0	-	1.5	-
lgoo	3.0	1.0	2.0	2.0	4.0	4.0	3.0	3.0	-	1.0	3.0	2.5	-
MA	2.3	2.4	2.1	1.5	1.1	0.6	1.6	1.8	1.1	1.2	1.6	2.4	1.6

ased on a 1 year record.

Table X

Average Wind Speed (mph)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Adelaide	10	9	8	8	8	8	8	9	9	10	10	10
Boulia	-	-	-	-	-	-	-	-	-	-	-	-
Broome	4	3	3	2	2	2	2	3	3	3	4	4
Burketown	4	3	3	5	5	5	4	5	6	6	5	4
Cape Leeuwin	9	10	10	8	11	12	12	12	13	11	10	10
Carnarvon	9	8	8	6	5	4	5	6	8	8	8	9
Charleville	7	8	8	5	5	5	5	6	6	8	8	8
Charlotte Waters	-	-	-	-	-	-	-	-	-	-	-	-
Condon	7	8	8	7	9	10	10	11	10	9	8	9
Dubbo	-	-	-	-	-	-	-	-	-	-	-	-
Esperance	11	11	10	9	8	7	8	11	10	9	10	10
Eucla	4	3	3	3	3	3	3	3	4	4	4	4
Farina	-	-	-	-	-	-	-	-	-	-	-	-
Halls Creek	8	7	7	7	7	7	6	6	7	7	7	8
Katherine	-	-	-	-	-	-	-	-	-	-	-	-
Laverton	-	-	-	-	-	-	-	-	-	-	-	-
Melbourne	9	8	8	7	7	7	9	8	9	8	9	9
Mundiwindi	7	7	6	7	6	7	8	9	9	8	7	8
Tennant Creek	-	-	-	-	-	-	-	-	-	-	-	-
Toowoomba	-	-	-	-	-	-	-	-	-	-	-	-
Townsville	7	8	8	9	6	7	7	7	8	8	9	9
Warburton Range	-	-	-	-	-	-	-	-	-	-	-	-
Wilcannia	-	-	-	-	-	-	-	-	-	-	-	-
Yalgoo	-	-	-	-	-	-	-	-	-	-	-	-
YUMA	6	6	7	7	6	6	6	6	5	5	5	5

ANNEX B

YPG Climatological Calendar and Climate Summary

U.S. ARMY, YUMA PROVING GROUND, YUMA, ARIZONA
DAILY TEMPERATURE MEANS AND EXTREMES, WITH YEAR OF OCCURENCE
MONTHLY SUMMARY OF AVERAGE CLIMATOLOGICAL DATA

JANUARY

Day	AVG HIGH	HIGHEST	YEAR	AVG LOW	LOWEST	YEAR
1	65	74	1962	40	29	1967
2	64	74	1964	38	29	1960
3	63	76	1969	39	28	1960
4	63	75	1969	38	30	1967
5	64	77	1969	39	30	1971
6	65	78	1954	39	27	1971
7	66	82	1962	40	25	1971
8	65	82	1962	39	23	1971
9	66	79	1962	40	26	1971
10	67	77	1956	40	25	1964
11	67	77	1956	41	30	1954
12	66	78	1956	41	25	1962
13	66	76	1959	42	28	1963
14	67	77	1967	41	26	1964
15	69	78	1967	45	28	1963
16	69	79	1961	45	28	1963
17	69	81	1959	44	31	1963
18	69	85	1971	42	31	1963
19	69	89	1971	42	35	1960
20	68	86	1971	43	28	1963
21	67	79	1971	42	30	1973
22	66	77	1970	42	31	1963
23	68	77	1968	42	32	1966
24	68	76	1959	42	31	1966
25	69	79	1959	42	30	1964
26	79	81	1971	43	30	1964
27	69	32	1971	44	34	1964
28	70	84	1971	43	33	1972
29	71	84	1971	42	36	1964
30	70	83	1971	42	31	1969
31	71	84	1954	44	36	1957

U.S. ARMY, YUMA PROVING GROUND, YUMA, ARIZONA
DAILY TEMPERATURE MEANS AND EXTREMES, WITH YEAR OF OCCURENCE
MONTHLY SUMMARY OF AVERAGE CLIMATOLOGICAL DATA

FEBRUARY

Day	AVG HIGH	HIGHEST	YEAR	AVG LOW	LOWEST	YEAR
1	72	83	1963	43	35	1957
2	70	86	1954	45	36	1969
3	70	87	1963	43	29	1956
4	72	88	1963	43	28	1956
5	73	87	1963	43	31	1964
6	71	88	1963	46	38	1959
7	72	90	1963	46	36	1956
8	72	86	1970	45	39	1955
9	73	81	1957	49	37	1955
10	71	85	1962	46	33	1956
11	73	87	1971	47	33	1956
12	73	88	1971	47	35	1966
13	73	89	1957	46	34	1964
14	73	91	1957	46	35	1972
15	73	87	1957	45	26	1964
16	72	82	1955	46	38	1956
17	72	84	1972	45	29	1956
18	73	82	1958	45	34	1956
19	72	85	1972	47	37	1955
20	71	85	1963	46	33	1955
21	73	84	1963	48	34	1955
22	74	85	1954	46	32	1964
23	73	88	1954	48	36	1955
24	74	93	1954	46	38	1964
25	76	90	1954	46	30	1960
26	75	90	1963	49	40	1956
27	74	88	1972	46	33	1964
28	75	90	1972	47	30	1962
29	78	74	1972	51	40	1956
30						
31						

U.S. ARMY, YUMA PROVING GROUND, YUMA, ARIZONA
DAILY TEMPERATURE MEANS AND EXTREMES, WITH YEAR OF OCCURENCE
MONTHLY SUMMARY OF AVERAGE CLIMATOLOGICAL DATA

MARCH

Day	AVG HIGH	HIGHEST	YEAR	AVG LOW	LOWEST	YEAR
1	74	89	1967	48	35	1962
2	74	86	1967	47	36	1971
3	74	86	1959	47	35	1971
4	74	92	1972	47	35	1964
5	75	95	1972	46	38	1965
6	73	93	1972	48	38	1965
7	76	91	1972	48	41	1963
8	78	91	1972	48	35	1969
9	75	92	1972	49	32	1964
10	75	95	1972	50	40	1964
11	75	91	1972	50	39	1964
12	75	92	1972	48	40	1969
13	75	90	1972	49	32	1956
14	77	90	1972	49	39	1962
15	77	93	1972	48	34	1962
16	77	92	1972	50	38	1956
17	77	94	1972	51	43	1957
18	78	91	1972	49	38	1954
19	78	91	1960	50	44	1963
20	79	93	1960	52	45	1970
21	81	93	1960	50	43	1964
22	78	92	1967	52	38	1955
23	79	91	1956	52	43	1955
24	78	91	1956	51	45	1962
25	81	90	1955	51	41	1964
26	82	92	1962	52	41	1964
27	82	92	1971	55	44	1954
28	82	94	1971	55	45	1972
29	82	98	1971	53	44	1973
30	83	97	1969	53	42	1967
31	83	97	1966	54	45	1967

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U.S. ARMY, YUMA PROVING GROUND, YUMA, ARIZONA

DAILY TEMPERATURE MEANS AND EXTREMES, WITH YEAR OF OCCURENCE

MONTHLY SUMMARY OF AVERAGE CLIMATOLOGICAL DATA

APRIL

Day	AVG HIGH	HIGHEST	YEAR	AVG LOW	LOWEST	YEAR
1	81	98	1956	54	48	1954
2	80	98	1959	53	44	1956
3	82	100	1961	54	45	1958
4	83	103	1961	54	44	1955
5	86	97	1960	55	43	1958
6	85	97	1960	56	45	1958
7	84	96	1962	56	44	1964
8	85	97	1962	55	46	1958
9	86	96	1960	56	44	1973
10	87	95	1960	58	48	1973
11	85	94	1971	57	46	1967
12	85	98	1962	57	44	1967
13	87	102	1962	56	45	1967
14	86	102	1962	58	50	1972
15	86	102	1962	56	44	1970
16	87	103	1953	58	49	1970
17	86	104	1953	58	49	1963
18	84	104	1953	57	49	1963
19	83	101	1953	56	45	1968
20	84	103	1958	56	48	1972
21	84	104	1958	55	46	1973
22	85	101	1958	56	43	1957
23	85	98	1962	56	44	1967
24	85	97	1962	57	49	1961
25	85	95	1966	58	48	1960
26	85	98	1973	58	49	1971
27	86	100	1973	57	47	1963
28	88	98	1959	58	46	1970
29	88	102	1959	58	44	1970
30	89	100	1965	59	49	1967
31						

U.S. ARMY, YUMA PROVING GROUND, YUMA, ARIZONA
DAILY TEMPERATURE MEANS AND EXTREMES, WITH YEAR OF OCCURENCE
MONTHLY SUMMARY OF AVERAGE CLIMATOLOGICAL DATA

MAY

1 AVG HIGH 90 HIGHEST 101 YEAR 1961 AVG LOW 60 LOWEST 47 YEAR 1967	**2** AVG HIGH 90 HIGHEST 103 YEAR 1962 AVG LOW 60 LOWEST 49 YEAR 1967	**3** AVG HIGH 88 HIGHEST 103 YEAR 1962 AVG LOW 60 LOWEST 52 YEAR 1955	**4** AVG HIGH 88 HIGHEST 100 YEAR 1962 AVG LOW 60 LOWEST 51 YEAR 1964	**5** AVG HIGH 88 HIGHEST 105 YEAR 1958 AVG LOW 60 LOWEST 46 YEAR 1964	**6** AVG HIGH 89 HIGHEST 104 YEAR 1963 AVG LOW 61 LOWEST 48 YEAR 1964	**7** AVG HIGH 89 HIGHEST 103 YEAR 1963 AVG LOW 61 LOWEST 54 YEAR 1965
8 AVG HIGH 90 HIGHEST 102 YEAR 1962 AVG LOW 61 LOWEST 50 YEAR 1964	**9** AVG HIGH 91 HIGHEST 102 YEAR 1960 AVG LOW 63 LOWEST 54 YEAR 1964	**10** AVG HIGH 91 HIGHEST 106 YEAR 1960 AVG LOW 63 LOWEST 57 YEAR 1956	**11** AVG HIGH 92 HIGHEST 110 YEAR 1960 AVG LOW 63 LOWEST 55 YEAR 1957	**12** AVG HIGH 88 HIGHEST 106 YEAR 1960 AVG LOW 63 LOWEST 55 YEAR 1957	**13** AVG HIGH 92 HIGHEST 102 YEAR 1960 AVG LOW 64 LOWEST 49 YEAR 1962	**14** AVG HIGH 91 HIGHEST 100 YEAR 1972 AVG LOW 64 LOWEST 54 YEAR 1962
15 AVG HIGH 93 HIGHEST 102 YEAR 1970 AVG LOW 63 LOWEST 50 YEAR 1957	**16** AVG HIGH 96 HIGHEST 108 YEAR 1970 AVG LOW 64 LOWEST 53 YEAR 1962	**17** AVG HIGH 97 HIGHEST 109 YEAR 1970 AVG LOW 66 LOWEST 52 YEAR 1962	**18** AVG HIGH 97 HIGHEST 107 YEAR 1958 AVG LOW 67 LOWEST 57 YEAR 1962	**19** AVG HIGH 97 HIGHEST 108 YEAR 1958 AVG LOW 67 LOWEST 58 YEAR 1971	**20** AVG HIGH 96 HIGHEST 106 YEAR 1958 AVG LOW 68 LOWEST 56 YEAR 1957	**21** AVG HIGH 95 HIGHEST 108 YEAR 1958 AVG LOW 66 LOWEST 54 YEAR 1972
22 AVG HIGH 94 HIGHEST 106 YEAR 1958 AVG LOW 65 LOWEST 53 YEAR 1971	**23** AVG HIGH 94 HIGHEST 105 YEAR 1958 AVG LOW 65 LOWEST 56 YEAR 1965	**24** AVG HIGH 94 HIGHEST 106 YEAR 1958 AVG LOW 65 LOWEST 55 YEAR 1957	**25** AVG HIGH 94 HIGHEST 106 YEAR 1958 AVG LOW 65 LOWEST 56 YEAR 1965	**26** AVG HIGH 95 HIGHEST 108 YEAR 1958 AVG LOW 66 LOWEST 58 YEAR 1962	**27** AVG HIGH 95 HIGHEST 109 YEAR 1958 AVG LOW 67 LOWEST 54 YEAR 1962	**28** AVG HIGH 96 HIGHEST 113 YEAR 1958 AVG LOW 66 LOWEST 55 YEAR 1962
29 AVG HIGH 97 HIGHEST 1111 YEAR 1958 AVG LOW 67 LOWEST 53 YEAR 1971	**30** AVG HIGH 96 HIGHEST 106 YEAR 1969 AVG LOW 69 LOWEST 59 YEAR 1971	**31** AVG HIGH 95 HIGHEST 103 YEAR 1969 AVG LOW 55 LOWEST 59 YEAR 1971				

U.S. ARMY, YUMA PROVING GROUND, YUMA, ARIZONA
DAILY TEMPERATURE MEANS AND EXTREMES, WITH YEAR OF OCCURENCE
MONTHLY SUMMARY OF AVERAGE CLIMATOLOGICAL DATA

JUNE

	AVG HIGH	HIGHEST	YEAR	AVG LOW	LOWEST	YEAR
1	97	108	1957	66	57	1955
2	99	112	1957	69	60	1955
3	99	112	1957	70	57	1971
4	99	111	1957	70	59	1971
5	99	114	1957	70	59	1971
6	99	111	1973	69	62	1962
7	98	114	1973	70	63	1968
8	97	114	1955	68	60	1968
9	96	113	1955	68	59	1965
10	95	110	1956	68	60	1964
11	98	114	1956	67	60	1954
12	99	113	1956	70	62	1964
13	99	113	1959	72	62	1970
14	100	117	1961	70	61	1962
15	99	115	1961	71	54	1962
16	101	109	1961	72	58	1962
17	102	111	1959	72	61	1965
18	104	115	1968	73	64	1965
19	105	115	1960	75	62	1965
20	105	116	1960	75	64	1965
21	107	115	1960	75	68	1965
22	107	115	1960	76	67	1965
23	106	115	1959	76	68	1963
24	106	118	1957	76	62	1965
25	106	115	1961	77	67	1965
26	105	114	1957	75	59	1965
27	106	113	1958	76	65	1965
28	105	112	1958	77	66	1965
29	105	111	1960	77	69	1965
30	106	113	1960	77	71	1970
31						

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JULY

U.S. ARMY, YUMA PROVING GROUND, YUMA, ARIZONA
DAILY TEMPERATURE MEANS AND EXTREMES, WITH YEAR OF OCCURENCE
MONTHLY SUMMARY OF AVERAGE CLIMATOLOGICAL DATA

Day	AVG HIGH	HIGHEST	YEAR	AVG LOW	LOWEST	YEAR
1	107	114	1972	77	70	1958,68
2	107	113	1972	78	67	1954
3	107	114	1957	79	69	1956
4	108	116	1972	78	69	1956
5	106	112	1954	78	67	1961
6	106	113	1966	77	69	1961
7	106	114	1958	78	69	1955
8	106	117	1958	80	71	1955
9	107	118	1958	80	73	1960
10	108	115	1958	81	71	1955
11	108	117	1958	81	75	1960
12	108	116	1964	81	73	1960
13	108	113	1960	80	68	1962
14	108	114	1963	81	73	1962
15	107	113	1960	82	70	1962
16	105	115	1960	82	69	1962
17	104	112	1960	81	70	1962
18	106	116	1960	82	76	1962
19	107	113	1960	81	73	1958
20	106	115	1960	82	74	1958,72
21	105	112	1963	82	74	1973
22	106	114	1963	82	74	1973
23	106	113	1959	82	70	1973
24	105	113	1957	82	72	1973
25	106	113	1963	81	75	1965
26	106	112	1959	82	77	1955
27	106	112	1954	82	77	1958
28	107	114	1964	82	74	1958
29	104	112	1972	82	76	1961,65
30	104	115	1957	82	68	1958
31	106	118	1957	83	76	1958

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U.S. ARMY, YUMA PROVING GROUND, YUMA, ARIZONA

DAILY TEMPERATURE MEANS AND EXTREMES, WITH YEAR OF OCCURENCE

AUGUST — MONTHLY SUMMARY OF AVERAGE CLIMATOLOGICAL DATA

Day	AVG HIGH	HIGHEST	YEAR	AVG LOW	LOWEST	YEAR
1	106	115	1972	82	75	1959
2	106	114	1960	83	75	1956
3	105	114	1969	82	73	1956
4	104	115	1969	80	70	1956
5	104	111	1969	80	68	1956
6	105	112	1970	81	73	1956
7	105	112	1962	80	73	1957
8	105	111	1956	81	72	1957
9	106	111	1965	82	74	1967
10	106	112	1962	83	78	1960
11	105	114	1962	82	78	1962
12	106	113	1962	81	70	1955
13	106	113	1962	82	76	1964
14	104	112	1956,72	81	69	1954
15	104	111	1962	80	70	1968
16	104	112	1069	81	69	1968
17	102	110	1960,62	79	72	1954
18	104	114	1960	80	71	1972
19	103	109	1960	80	72	1972,73
20	103	113	1969	80	74	1959
21	103	115	1969	80	73	1957
22	104	115	1969	79	68	1954
23	104	113	1969	78	66	1968
24	104	110	1957	79	69	1968
25	105	115	1962	79	70	1954
26	104	112	1967	79	68	1972
27	104	112	1967	78	68	1956
28	105	111	1962	78	69	1973
29	105	116	1954	80	72	1964
30	104	110	1954	79	68	1957,62
31	103	110	1959	77	65	1957

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U.S. ARMY, YUMA PROVING GROUND, YUMA, ARIZONA
DAILY TEMPERATURE MEANS AND EXTREMES, WITH YEAR OF OCCURENCE
MONTHLY SUMMARY OF AVERAGE CLIMATOLOGICAL DATA

SEPTEMBER

Day	AVG HIGH	HIGHEST	YEAR	AVG LOW	LOWEST	YEAR
1	102	114	1969	76	67	1966
2	103	110	1962	77	68	1964
3	103	110	1956	77	69	1964
4	103	111	1955	78	69	1961
5	104	110	1955	77	65	1961
6	104	112	1958	77	69	1973
7	104	111	1955	77	69	1964
8	104	110	1963,69	78	69	1965
9	105	113	1968	78	66	1961
10	104	111	1963	79	68	1972
11	104	112	1963,71	78	68	1957,72
12	103	114	1971	79	67	1972
13	102	112	1971	77	70	1957,72
14	101	109	1971	74	63	1970
15	101	107	1962,65,71	74	63	1970
16	101	109	1962	73	62	1970
17	99	113	1956	73	64	1959
18	98	113	1956	72	65	1959,73
19	97	111	1962	70	61	1973
20	97	107	1958	69	55	1965
21	98	109	1958	69	59	1965
22	96	110	1966	70	62	1965
23	97	110	1966	68	58	1960
24	97	107	1956	69	61	1958
25	98	111	1963	69	62	1959,68
26	99	111	1956	69	62	1968
27	98	107	1963	70	61	1971
28	98	107	1969	70	59	1971
29	96	106	1969	70	61	1962
30	97	105	1969	69	57	1959
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U.S. ARMY, YUMA PROVING GROUND, YUMA, ARIZONA
DAILY TEMPERATURE MEANS AND EXTREMES, WITH YEAR OF OCCURENCE
MONTHLY SUMMARY OF AVERAGE CLIMATOLOGICAL DATA

OCTOBER

Day	AVG HIGH	HIGHEST	YEAR	AVG LOW	LOWEST	YEAR
1	96	103	1955	68	57	1971
2	95	103	1955	67	54	1959
3	93	102	1963	67	56	1959
4	92	102	1964	66	54	1959
5	92	105	1964	65	53	1959
6	93	104	1964	66	56	1969
7	93	103	1960	66	58	1957
8	92	103	1963	65	55	1970
9	92	102	1965	64	47	1961
10	92	100	1958,64	63	47	1961
11	92	104	1965	62	50	1973
12	93	105	1965	62	51	1961
13	93	102	1958	62	49	1969
14	92	102	1958	65	53	1963
15	89	104	1958	63	54	1966
16	88	103	1958	61	50	1966
17	89	103	1959	61	52	1960
18	87	99	1958,73	60	49	1971
19	88	99	1973	59	47	1971
20	88	96	1954,67,73	60	53	1969,71
21	87	96	1954	59	52	1969
22	88	96	1954,56	59	51	1957
23	88	101	1959	60	52	1957
24	86	102	1959	59	45	1961
25	87	99	1959	57	46	1961
26	87	99	1965	56	47	1971
27	87	99	1965	58	50	1954
28	85	96	1965	57	51	1954,71
29	83	96	1965	57	43	1971
30	80	96	1965	56	38	1971
31	82	95	1965	54	36	1971

U.S. ARMY, YUMA PROVING GROUND, YUMA, ARIZONA
DAILY TEMPERATURE MEANS AND EXTREMES, WITH YEAR OF OCCURENCE
MONTHLY SUMMARY OF AVERAGE CLIMATOLOGICAL DATA

NOVEMBER

Day	AVG HIGH	HIGHEST	YEAR	AVG LOW	LOWEST	YEAR
1	82	94	1962,66	53	41	1972
2	80	90	1962	53	42	1956
3	82	94	1962	53	42	1961
4	82	92	1962,65	53	40	1956
5	81	89	1958	53	41	1956
6	82	89	1965	54	44	1956
7	81	90	1956	52	46	1968,73
8	80	90	1956,62	53	48	1963,71
9	81	92	1956	51	43	1955
10	82	90	1973	51	40	1966
11	80	92	1973	51	42	1966
12	79	93	1972	52	42	1958
13	77	89	1967	53	44	1965
14	75	88	1967	50	42	1964
15	73	87	1967	50	40	1964
16	72	86	1967	49	35	1964
17	73	84	1967	46	31	1958
18	72	86	1967	46	35	1958
19	73	83	1966	46	35	1961,64
20	74	83	1954	47	33	1956
21	73	84	1954	48	36	1956
22	72	85	1954	47	40	1964
23	73	86	1954	47	39	1955,61
24	75	86	1954	46	37	1973
25	75	86	1954	48	38	1966
26	74	85	1954	49	39	1966
27	73	85	1954	46	35	1973
28	73	85	1954	46	38	1959
29	72	82	1966	47	41	1959
30	71	80	1966	47	40	1956,57
31						

U.S. ARMY, YUMA PROVING GROUND, YUMA, ARIZONA
DAILY TEMPERATURE MEANS AND EXTREMES, WITH YEAR OF OCCURENCE
MONTHLY SUMMARY OF AVERAGE CLIMATOLOGICAL DATA

DECEMBER

Day	AVG HIGH	HIGHEST	YEAR	AVG LOW	LOWEST	YEAR
1	72	81	1966	46	38	1972
2	71	83	1959	47	39	1956,57
3	71	84	1958	46	39	1972
4	70	82	1958	45	37	1960
5	70	80	1958	45	36	1968
6	70	82	1966	44	34	1972
7	69	79	1958	44	35	1960
8	67	80	1962	43	34	1960
9	67	82	1962	44	31	1971
10	67	80	1962	44	31	1960
11	68	80	1972	42	34	1971
12	68	82	1958	41	28	1972
13	67	79	1958	41	33	1963
14	66	79	1958	41	31	1963
15	65	77	1958	41	30	1963
16	67	74	1958,62,73	41	32	1964,71
17	66	77	1958	41	34	1963
18	66	76	1958	42	34	1968
19	68	75	1960,66	42	33	1968
20	68	78	1955	42	35	1968,71
21	67	78	1955	41	29	1968
22	67	77	1955	43	26	1968
23	68	80	1955	43	32	1968
24	69	81	1964	42	32	1968
25	68	77	1960	43	31	1963
26	67	77	1955	41	32	1954
27	66	75	1956	41	31	1966,68
28	66	78	1956	41	34	1966
29	65	78	1963	40	26	1954
30	65	71	1963	39	33	1968
31	64	72	1963	39	29	1972

WINTER	NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH		APRIL	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
Average Temperature	50	76	43	68	42	67	46	73	50	78	56	85
Record Temperature	31	94	26	84	23	89	26	93	32	98	43	104
Average Soil Temperature	49	93	42	79	39	80	44	90	49	102	55	116
Record Soil Temperature	30	119	25	100	18	107	22	116	26	128	38	147
Average Density Altitude	-50	+1600	-800	+730	-780	+960	-450	+1320	+40	+1600	+430	+2090
Average Relative Humidity	20%	55%	25%	59%	23%	62%	20%	58%	16%	50%	13%	42%
Average Pressure	1002.0	1006.4	1003.4	1008.5	1004.3	1009.2	1001.9	1007.2	1000.3	1004.8	997.9	1002.7
Average Heating Degree Days	60		295		326		154		31		0	
Average Cooling Degree Days	0		0		0		0		0		0	
Average Surface Winds	NNW4		NNW5		NNW5		NNW5		W5		W6	
Sky Cover (%)	28		36		36		40		35		23	
Solar Insolation (daily average Langleys)	338		284		311		410		523		648	
Ozone Hourly Average $\left(\frac{\text{parts}}{10^8}\right)$	2.3		2.0		1.9		2.4		2.8		3.3	
Precipitation (inches)	.23		.40		.40		.34		.24		.15	
Inversions												
% of Occurance	97		90		93		96		100		93	
Average Height (ft)	1530		1560		1500		1410		1350		1050	
Temperature @ Top (^{o}F)	64.0		59.5		57.2		54.7		66.0		70.7	

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SUMMER	MAY		JUNE		JULY		AUGUST		SEPTEMBER		OCTOBER	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
Average Temperature (^{o}F)	64	93	72	102	81	106	80	105	74	100	69	89
Record Temperature (^{o}F)	46	113	54	118	67	118	65	116	55	114	36	106
Average Soil Temperature	63	128	72	136	82	141	82	137	75	130	61	113
Record Soil Temperature	46	147	55	158	63	160	62	157	55	149	33	138
Average Density Altitude	+950	+2840	+1590	+3430	+2140	+3700	+2140	+3700	+1700	+3350	+740	+2500
Average Relative Humidity	12%	41%	12%	41%	19%	49%	23%	58%	18%	52%	18%	52%
Average Pressure (mb)	995.8	1000.2	993.7	998.0	994.7	999.2	994.9	999.5	995.0	999.3	998.2	1002.5
Average Heating Degree Days	0		0		0		0		0		0	
Average Cooling Degree Days	109		360		574		543		360		0	
Average Surface Winds	W6		W6		SW6		SSW6		W5		W4	
Sky Cover (%)	17		13		29		31		20		22	
Solar Insolation (daily average Langleys)	725		740		675		620		560		448	
Ozone Hourly Average (parts / 10^8)	3.4		2.7		2.4		2.2		2.3		2.4	
Precipitation (inches)	.02		.07		.17		.49		.40		.45	
Inversions												
% of Occurance	97		100		82		81		90		77	
Average Height (ft)	1140		1290		790		690		750		1500	
Temperature @ Top (^{o}F)	73.8		88.2		90.1		87.8		80.8		76.8	

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WIND SPEED
AVE % OCCURRENCE
1966 - 1976

	CALM	1-3	4-7	8-12	13-18	19-24	25-31	MPH
Jan	9.0	51.5	22.2	12.6	4.2	0.7		
Feb	10.0	49.1	24.9	12.5	4.1	0.7	0.1	
Mar	8.9	41.4	28.4	15.5	4.9	0.7		
Apr	7.9	34.0	30.5	21.0	6.1	0.5		
May	8.3	31.5	32.3	23.1	4.6	0.2		
Jun	6.2	34.1	31.6	24.5	3.1			
Jul	4.2	30.2	32.9	29.2	3.4	0.1		
Aug	6.2	30.9	33.9	25.5	3.6	0.2		
Sep	11.2	35.4	33.7	16.5	2.8	0.1		
Oct	10.5	47.0	26.6	12.2	3.6	0.2		
Nov	16.3	48.0	21.5	11.5	2.4	0.1		
Dec	12.6	46.4	23.6	12.7	4.4	0.4		
Year	9.3	40.0	28.5	18.1	3.9	0.3		

WIND DIRECTION
AVG % OCCURRENCE
1966 - 1976

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
Jan	11.5	8.5	7.1	5.0	5.4	5.8	6.9	4.2	1.6	1.6	1.8	2.3	3.3	4.6	7.5	14.2
Feb	7.4	6.6	6.2	4.6	4.3	5.1	7.0	4.5	2.7	3.2	4.6	4.3	4.8	4.5	7.8	14.1
Mar	5.1	4.8	4.7	2.8	2.6	2.9	5.7	3.7	2.9	5.7	7.0	9.5	9.1	7.0	7.6	10.2
Apr	3.4	3.6	3.4	2.4	1.7	1.8	3.0	2.7	3.2	7.9	9.9	13.5	11.6	9.2	7.3	7.4
May	1.9	2.7	2.6	2.3	2.3	2.2	3.7	4.2	5.8	12.1	11.9	12.9	11.6	6.7	5.0	3.9
Jun	1.8	1.9	2.5	2.3	1.9	2.3	3.1	4.8	6.7	13.2	12.7	13.8	12.8	8.1	4.5	2.4
Jul	1.3	1.2	2.0	2.6	2.2	2.7	5.8	6.1	9.5	16.4	13.3	10.6	10.7	6.5	3.6	1.4
Aug	2.6	2.0	2.8	3.0	2.9	4.2	6.9	6.5	8.6	14.0	11.6	9.9	8.8	5.4	3.3	2.1
Sep	2.9	3.0	3.7	4.5	4.9	4.7	7.4	6.9	6.0	7.5	8.2	8.0	8.6	4.9	3.7	3.6
Oct	6.7	5.2	6.2	4.1	4.1	4.7	6.8	4.0	3.3	3.9	4.2	5.7	7.1	6.2	7.0	9.5
Nov	7.5	5.9	7.0	4.6	4.7	5.6	8.3	5.9	1.8	1.8	1.7	3.4	3.7	5.1	6.6	10.4
Dec	10.8	5.8	6.2	4.1	5.0	5.8	7.2	9.1	1.8	1.5	1.2	1.9	3.0	4.3	8.4	15.8
Year	5.2	4.3	4.5	3.5	3.5	4.0	6.0	5.2	4.5	7.4	7.3	8.0	7.9	6.0	6.0	7.9

CLIMATOLOGICAL SUMMARY

QUARTZSITE

Latitude: 33° 40" .667
Longtitude: 114° 14" .233
Elevation (FT): 890

Means for Period 1941-1970 ('42-'59 Missing)
Extremes for Period 1931-1972 ('42-'59 Missing)

Part I - Temperature

Month	Temperature (°F)							Mean Degree Days**
	Means			Extremes				
	Daily		Monthly	Record		Record		
	Max	Min		Highest	Year	Lowest	Year	
Jan	65.0	36.8	50.9	87	1971	15	1971*	438
Feb	71.3	42.0	56.7	88	1972*	18	1933	248
Mar	77.4	46.9	62.2	100	1934	24	1971	131
Apr	85.2	53.4	69.3	111	1936	33	1933	35
May	94.5	63.0	78.8	115	1934	40	1967	4
Jun	103.0	71.9	87.5	120	1936	50	1933	0
Jul	108.6	81.0	94.8	124	1934	62	1939*	0
Aug	106.1	79.7	92.9	124	1933	53	1970	0
Sep	100.4	70.3	85.4	116	1937*	45	1934	0
Oct	90.4	58.3	74.4	108	1934*	30	1935	0
Nov	75.4	46.2	60.8	94	1937*	20	1931	152
Dec	64.4	36.3	50.4	84	1933	19	1934	447
Year	86.8	57.2	72.0	124	Jul 1934*	15	Jan 1971*	1462

* Record equaled in earlier years.
**Base for degree day data is 65 degrees Fahrenheit.

Incl 1 Page 1 of 2

CLIMATOLOGICAL SUMMARY (Con't)

Part II -Precipitation Totals (Inches)

Month	Mean	Greatest Daily	Year	Snow, Sleet, Hail Mean	Snow, Sleet, Hail Maximum Monthly	Snow, Sleet, Hail Year	Estimated Mean Relative Humidity (%) 0600 MST	Estimated Mean Relative Humidity (%) 1800 MST
Jan	0.51	0.85	1941	0.0	1.8	1937	47	29
Feb	0.35	1.10	1931	0.0	0.0		39	24
Mar	0.40	1.06	1941	0.0	0.0		34	17
Apr	0.19	1.15	1931	0.0	0.0		32	17
May	0.00	0.11	1935	0.0	0.0		22	13
Jun	0.01	1.40	1938	0.0	0.0		21	9
Jul	0.43	0.80	1937	0.0	0.0		31	16
Aug	0.74	2.00	1941	0.0	0.0		39	21
Sep	0.46	3.00	1939	0.0	0.0		34	20
Oct	0.30	1.75	1932	0.0	0.0		34	21
Nov	0.46	1.30	1969	0.0	0.0		33	24
Dec	0.52	1.28	1938	0.0	3.0	1932	43	34
Year	4.37	3.00	Sep 1939	0.0	3.0	Dec 1932	34	20

Part III - Statistical Summary (Days)

Month	Precipitation .10 Inches or More	Temperature Maximum 90° & Above	Temperature Maximum 32° & Below	Temperature Minimum 32° & Below	Temperature Minimum 0° & Below
Jan	2	0	0	11	0
Feb	2	0	0	3	0
Mar	2	1	0	1	0
Apr	1	12	0	0	0
May	0	22	0	0	0
Jun	+	28	0	0	0
Jul	2	31	0	0	0
Aug	2	31	0	0	0
Sep	1	29	0	0	0
Oct	1	20	0	0	0
Nov	1	1	0	1	0
Dec	1	0	0	10	0
Year	15	175	0	26	0

+Less than one half.

ANNEX C

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